

Pastimes for the Patient

REVISED EDITION

By Marguerite Ickis

The title of this book need not be taken too literally. Its nineteen chapters, each describing a craft, hobby, or entertainment, are meat for anyone, patient or impatient, who is looking for a new interest or recreational activity.

Pastimes for the Patient contains suggestions and directions for more than a dozen activities of a practical, constructive, and even a remunerative nature, if that is what is desired. It also devotes several chapters to passive interests and recreations.

The crafts are well selected and extremely varied. While some will appeal especially to men, all are suitable for women, and many for children.

Many a man who for years has had a strong desire to do creative work can fulfill this longing by reading, for example, the chapter on chip carving, a form of woodwork which does not tax the strength or need much space, and yet can yield beautiful and desired results. Equally appealing are the chapters on leather working, weaving, square knotting, fly-tying, photography in one room, and many others. For sheer fun, it would be hard to beat the three chapters on games, puzzles, and magic. For teachers, program directors, as well as for anyone

(Continued on back flap)

Other books by Marguerite Ickis

ARTS AND CRAFTS, A PRACTICAL HANDBOOK

NATURE IN RECREATION

PASTIMES for the patient

Revised Edition

by Marguerite Ickis

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Preface

In naming this book we were tempted to be waggish and add to the title which appears on the cover “——and for the impatient, etc.,” or something else in the same vein. In full justice to the contents we should have done something like that, for the activities described and illustrated here are just as appropriate and worth while for those in the full flush of health as for those who come under the designation of “patients.”

The title must therefore be understood as stating a potential and not as describing a limitation; otherwise a great many people might be deprived of some good honest fun which they really need. Here, then, is a collection of occupations—some creative and of varying degrees of physical activity, some passive, and some in the pure amusement category. It is addressed to the individual, but education and recreation leaders as well will find it exceedingly useful. It is all presented in the spirit of fun but many of the crafts to which the reader is introduced are solid and substantial and a door may hereby be opened to a serious and possibly remunerative activity.

Each chapter is complete in itself and there is such diversity in the various chapters that it will appeal to those of widely different tastes and temperaments. The instructions and illustrations are clear and can be followed without other help.

Anyone who wants a new interest or who needs a new interest or hobby can find enjoyment and profit in this book.

of titles we could express only the chief intention of this book. (Time was when a title ran to a half page or so.) This, therefore, is an amendment and amplification. If you must spend a day or two in bed, or a longer period, or if you can just manage to get in the eight hours daily which nature requires, you will find something here which will make life more exhilarating for you.



Unless you are different from practically everybody else in the world, you have probably said to yourself at one time or another, "I'd give anything to spend a few weeks doing absolutely nothing!"

If, however, your random wish has caught up with you in some unlooked-for way and you have no choice but to be idle for a while, it is in the course of human nature that you will shortly make a complete right-about and will long for something to do. Be careful, this time, though, and don't say, even to your innermost self, "I'd give *anything* to do *anything*!" Be practical and make a good wish, something like this: "I'd give a lot to have something interesting to do that I could do now." For that, too, can come true. It is, in fact, an immediate possibility.

Many a hobbyist could tell you of dozens of engrossing occupations which even a bedfast or a house-bound person can engage in, any one of them worthy of being a major interest, and having, besides, the virtue of giving satisfaction and entertainment if practised in a temporary or intermittent fashion.

Not that we are suggesting aimless dabbling or taking-and-leaving. What we do advocate is real recreation—doing things in the spirit of play and because they are fun. If

HIGH TIME FOR A HOBBY

you've never had time for hobbies before, you may have to try out several until you find one that really makes an appeal to you. A hobby is in the nature of an adventure, and when you are adventuring, if you don't like one trail it is perfectly good practice to back-track and try another.

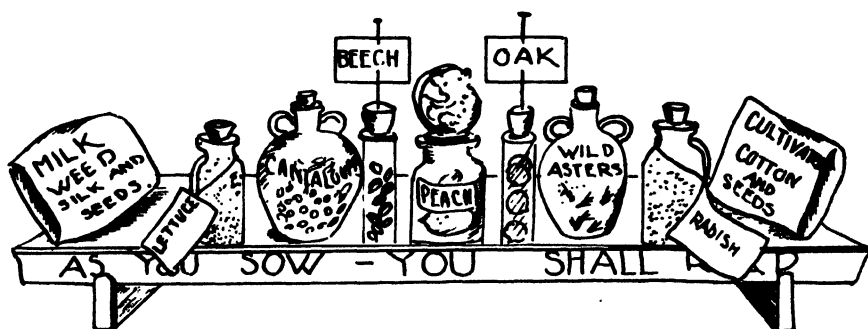
We hope that, among the exceedingly diversified pastimes included in this book, there will be several that you will find enjoyable. There may be one that will become a real avocation and you never can tell where that may lead you. Some great things have developed from hobbies.

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**PASTIMES
FOR THE PATIENT**

1. NATURE around your window

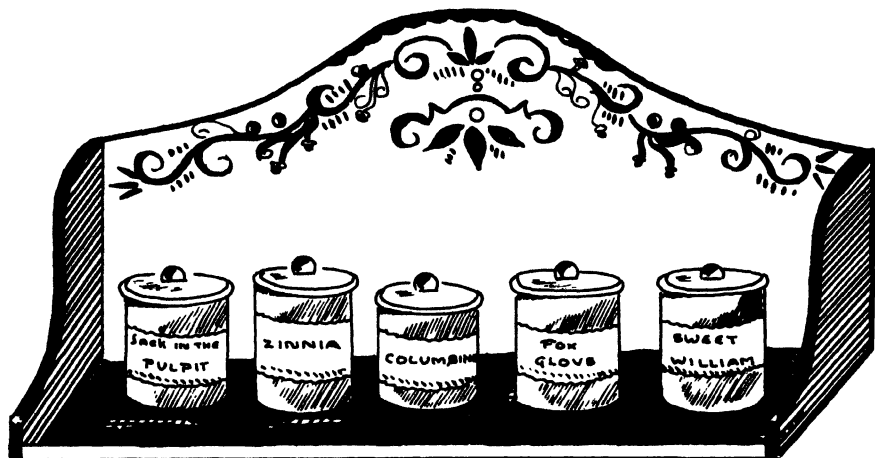


VARIETY GARDENING

GARDENING IN ONE ROOM can be much more extensive than just having a few potted plants about and seeing that they are watered, or ordering a window box from the florist, all set up with petunias and trailing vines.

To start with a bare window sill and plot and carry out a garden scheme is a real adventure, beset with hazards, expectation, and surprises, just like gardening on a larger scale.

A good way to begin miniature gardening is by collecting seeds. Collect any and every kind of seed. You never can tell what you are going to want, once you begin, and you will soon find yourself in communication with other small time growers, making exchanges and swapping experiences. There is a strong guild feeling among gardeners just as among fishermen, and the same urge to narrate, compare, and rival.

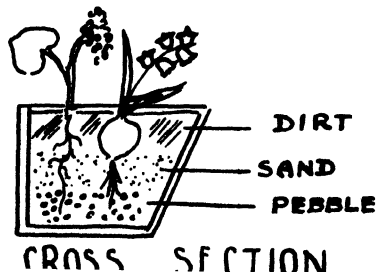


Get a number of small glass bottles and label them. Your friends will be glad to save you a few seeds from each of their packets. Enlist the services of rovers and hikers and get some seeds that fall from plants growing in fields and woods. Get some fruit seeds. The difference in seeds is a study in itself. Some are large and beautiful and shiny. If you don't want to plant them or to give them away, perhaps you know a small child who would like them for a necklace.

When you have accumulated a good assortment of seeds it is time to start the window gardening. Any box of suitable size and shape for your window sill will do. You needn't buy one. You will need another box, too—a shallow one—for cuttings or for plants for resetting, for you will shortly be able to share some of your garden products with friends and colleagues.

Fill the bottom of the window box with small pebbles and sand for drainage. Cover this over with good earth from a garden that has been well fertilised, or with woods dirt. This is standard procedure for gardening either indoors or out. If you are in the city, you can buy dirt from a florist.

You will have to plan your garden according to such light, shade, and



sunshine as your window exposure will give, so you will need to know about the kind of plants that will take kindly to your location. To post yourself on this sort of information, send for seed catalogues. All the large growers get out beautiful books, many of them with coloured plates. They make very interesting reading for anyone who loves plants and flowers. If you have a taste for names as well and like to roll syllables around, you will enjoy learning the formal names of some of the familiar garden flowers, as well as their local names in different sections and countries.

To encourage yourself by seeming to get somewhere quickly in this gardening venture, start growing a pumpkin or a gourd. You will not have to wait long for results, for these seeds sprout quickly and soon you will have a lusty, blossoming vine.

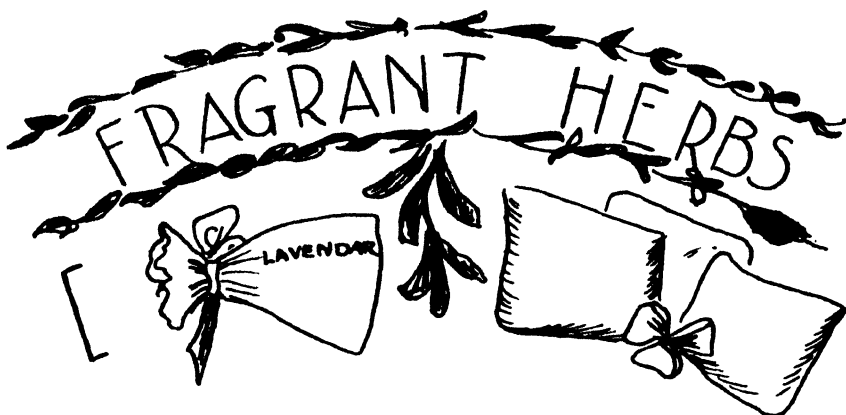
Plant several seeds at intervals during a week and check their growth. Many will never reach maturity in your window, but you will have learned to recognise them and you can give them to your friends to transplant in their gardens. Some of these vines will grow in water, but you must have one or two at least in your window box.

At first you might find it more exciting to sow mixed seeds and to postpone scientific planning until later on. Mixed seed packets can be bought, but if you have a collection in bottles, mix your own. See how many you can identify before they bloom.

An interesting side path for a gardener is to learn something of the origin of his own flowers and plants. Can you give your flowers a nationality? For instance, zinnias, very common in our gardens, are natives of Mexico. There they were field flowers, and the colours of the ordinary varieties—the bright yellows, reds, and oranges—are those we associate with the native dress. The zinnias have been cultivated and refined, however, so that certain merchants who specialise in the seeds can supply them in the most delicate and rare shades. Blue phlox, eupatorium, and many other plants are field flowers in their native spots and garden flowers by adoption.

Poppies are attributed to China, tulips and hyacinths to Holland, and many of our herbs had their beginnings in England and France.

If you become interested in tracing the ancestry of any flower or plant you should know about the *Index Kewensis*. It is an exhaustive catalogue of practically everything that grows, an authoritative reference book (written in Latin). This work was initiated by Charles Darwin, who left a bequest to make it possible. It was named "Kewensis," after the Kew Gardens in London.



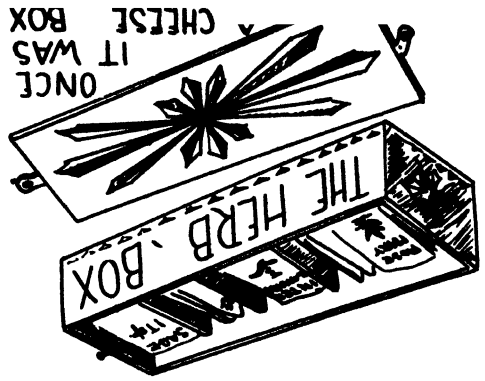
If you would like to have a special feature with a practical side, grow an herb garden in your window. You can grow ten kinds together in an average sized box. Your friends will appreciate jars of flavouring herbs for the kitchen shelf and bags of sweet herbs will please the fastidious for bureau drawers, clothes-presses and linen cupboards. Some of the fragrant herbs have homely virtues, as well, such as discouraging moths. A favourite and cleanly sweet scent for a clothes-press which will keep it free of marauders is composed of lavender flowers, whole cloves, and gum camphor.

You needn't mind breaking off stems from your herb plants, for others will soon grow in their places. The new shoots spring up from the roots. When the plants are full grown you can pick them and hang them up to dry. You will have to know in each case which part to save, and for this information we recommend "Victory Gardens—Harvesting and Drying," published by the National Recreation Association, 315 Fourth Avenue, New York, in 1943. This is an inexpensive paper pamphlet which contains all the needed information for a beginner in herb growing. Your seed catalogues will also give you many useful points.

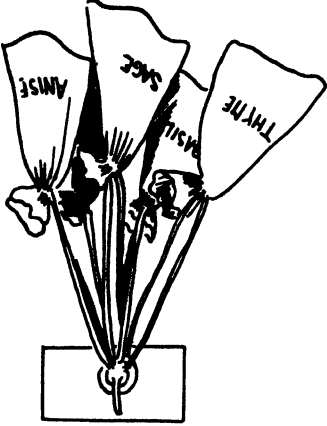
The most common flavouring herbs are: Sage, basil, balm, sorrel, savoury, thyme, parsley, mint. The aromatics: Rosemary, lavender (both flowers and leaves), sweet marjoram (leaves), thyme.



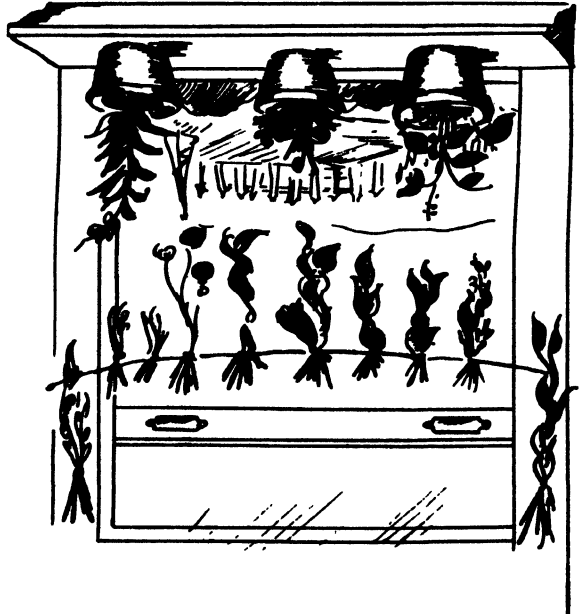
FOR ANY PANTRY SHELF



FOR A GIFT



GROWING AND DRYING





Another indoor gardening specialty. If you are impatient and want to see something green in very short order, get a sponge, wet it, and set it in a dish in which a small amount of water is kept to be sapped up by the sponge. Cover the sponge with flax seed. It will be green in three days. If you can wait a little longer, use radish seed and have a showing of green in five days. The tiny plants will have sturdy, shiny leaves. Grass seed, too, grows in this way. Avocado seeds will come to life in an egg cup, but they will take their time about it.

If it appeals to you to have a number of little garden spots in your room, some of the lowly vegetables can be used. The ones we already know about are:

Carrots: Cut off the top and three-quarters of the lower part of the bulb and place it in a dish surrounded by pebbles to hold it in place. Cover with water. Soon fern-like branches will begin to grow from the top. Some people have been heard saying that this is, indeed, a very good thing to do with carrots!



SWEET POTATO

Horse Radish: Slice and insert the slices in wet earth. They will sprout and will show foliage suggesting a tropical plant.

Practically everybody knows from school days that a sweet potato will sprout in water, very soon sending a trailer over the side of a dish or glass and showing buds.



1 AVOCADO PEAR
2. FLAX ON A SPONGE



FRUIT SALAD

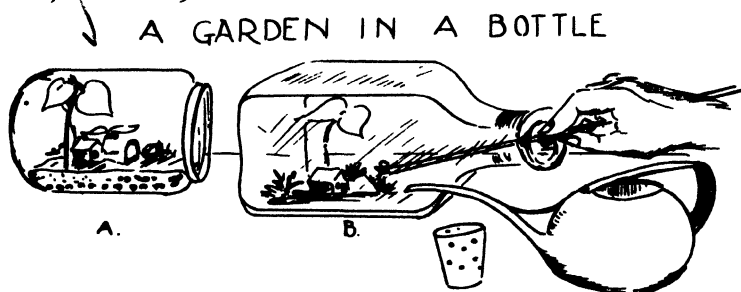
Save seeds from your fruits—grapefruit, apples, oranges, and lemons, and plant them in a small pot or bowl of good dirt. Before long you will have little plants with shiny leaves, suitable for a table decoration, a fruit salad to feast the eyes.

The following books will give you many other suggestions for dish gardening:

BEARD, PATTEN. *Adventuring in Dish Gardens*. New York: A. T. De La Mare Company, Inc., 1930.

STIERI, EMMANUELA. *Indoor Hobbies* (contains chapter). New York: Wittlesey House, McGraw-Hill Book Company, Inc., 1938.

WILSON, HELEN VAN PELT. *A Garden in the House*. New York: Sentinel Books, 112 East 19th Street.



To make a novelty garden in a bottle or a jar, put enough pebbles and sand on the bottom (in this case, the side it rests on) to take care of drainage, and cover them over with rich dirt. With a pair of tweezers or a long thin stick plant seeds in different spots and watch them grow. This is only the basic idea. You can elaborate as much as you like. Wet the sand and earth before putting them into the bottle. The plant needs both air and moisture, and the best way to regulate the atmosphere is to perforate the lid or cap and keep the jar or bottle covered to prevent evaporation. A tiny spray will serve as a watering can when your garden does need more moisture.



SCENIC GARDENS

A large glass globe can be used to make a beautiful scenic garden. You can create a jungle effect by having large plants such as hen and chickens, snake plants, and cacti, for overhanging foliage. Make small paths on the bottom with pebbles and put in figures of tiny creatures—small bright coloured birds or insects.

In a shallow dish or pan, make a terrarium. Mix builder's cement in a glass jar and build in high and low spots—mountains, valleys, streams. Make deep holes or depressions where you are going to do your planting. Remember that always the planting spots must have drainage, as noted before, so put in some coarse sand and cover it with earth. Paint the high spots of cement to blend with the scenery. Then for the landscaping. Do not be too zealous. Avoid over-decorating. Keep everything in proportion. You can have rocks, glens, mountains, bridges, little figures, China huts, toys, etc., all of which you can make yourself.

ARMATURE



HAIR
PIN



FIGURES DRESSED

Start with the larger objects first, and make the others in proportion. Trees and houses will be the tallest. The following plants can be used for trees: Boxwood, cacti, holly fern, maidenhair fern, club moss, dwarf juniper, fir, spruce, and red cedar. Use heather for shrubbery.

Make the little figures on armatures of wire hairpins. Roll them with bits of clay, after you have bent them into the posture you want them to hold. Let the clay dry before you paint them. Then cover them with shellac to make them waterproof.

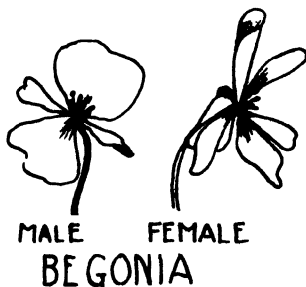
If you cover the surface of the terrarium with moss it will prevent evaporation and your garden will not require much watering.

POTTED PLANTS

You will have noticed that florists keep potted plants in very small pots. Most people without experience with house gardening think they are favouring their plants by repotting them. The small pot is better, however, because it binds the roots of the plants, and this stimulates them and makes them bloom. If there is too much soil, the plants become lazy and spread out below the soil line while they diminish above.

The indoor gardener must also know something about fertilisation. It takes place by water, wind, or insects, chiefly by the wind, which scatters the seed pods and pollen. Where conditions are lacking for natural fertilisation you must provide it. The violet is the only commonly known plant which is self-sufficient, that is, self-fertilising.

Plants which are fertilised by having their pollen transferred by insects have both male and female varieties. Such a one is the begonia, a favourite potted plant because of its beautiful leaves and profuse flowering. When you are growing begonias indoors, or any other plant in this category, you can transfer the pollen by using tweezers.

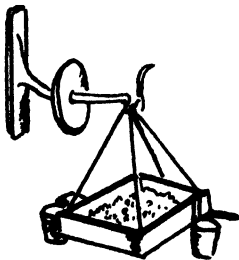
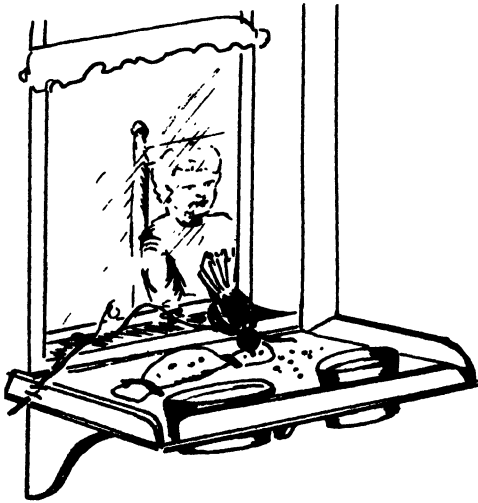


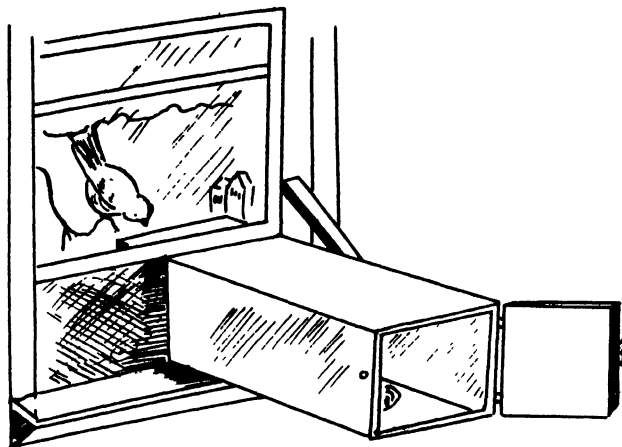
FEEDING STATIONS FOR BIRDS

If you want to have birds around your window, have a feeding station. The easiest kind to set up is a board with holes in it large enough to accommodate a number of earthenware cups, such as are used for baking custard. In these you put the various tidbits which the birds love, and soon you will have a great many visitors.

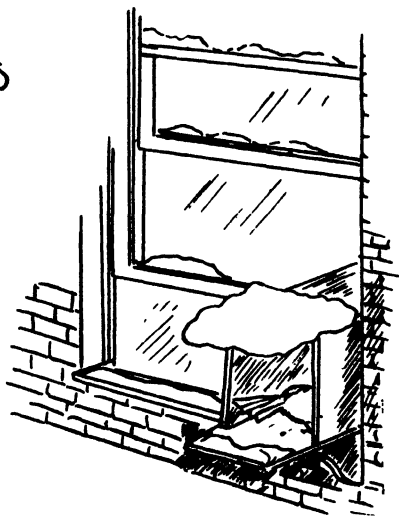
If you have a window box and only one window, you can at least have a snack bar for your feathered friends by hanging several pine cones outside the window. Dip them in melted suet in which seed has been mixed.

In case you cannot get near enough to the window to see or reach outside, you can have a special kind of feeding arrangement such as illustrated on the opposite page.





FEEDING STATIONS



As you see, the longer part of the oblong box is inside the room. There is a glass door at the inner end which can be opened and closed. If you are in a cold climate, have a door outside as well. Put the food near the outer opening, and along the tunnel, and you will shortly have regular visitors. The birds soon get wind of a new source of daily bounty, and they will understand the contrivance very readily. If you leave the outside door ajar in bad weather, they may be glad to take shelter there occasionally.

The favourite foods of the birds are: Pork rind, cooked meats, cut-up apple, bird seed, buckwheat, cocoanut meat, cracked corn, dog biscuit, suet. They also like raisins and peanuts. In regions where there are groves, the growers and packers are usually glad to give the rejected raisins or peanut ends to those who will call or send for them.

LOOK AND LISTEN

In early school days the nature period is usually welcomed as a respite from more exacting studies, with occasional field trips to break the monotony of classroom routine and make a picnic of lesson time. As a break in your present curriculum, and perhaps a rest from your gardening activities, give yourself a field trip around your room. Just look and listen for a while. Try to see with new eyes and hear with new ears all the daily phenomena inside your room and around your window.

If you start looking and listening you may find yourself going off on all kinds of nature excursions. At the end of any one of these there well may be a new hobby or a new line of reading or research.

Suppose you begin by just listening to what is going on outside your window. What sounds do you hear? How do the night sounds differ from the day sounds? What are the early morning sounds that register in your consciousness when you first waken? What are the evening sounds? What sounds are made by man and what other creatures do you hear? In the country or in a suburban community there will be many creature sounds to sort out and identify. Even in the city there are cats, dogs, birds, and now and then a horse to listen to and cogitate about. Domestic animals are exceedingly interesting and there is considerable literature about them. Why not read up on them? You might start a collection of stories, poems, and anecdotes about dogs, cats, or horses. You'll be surprised to find how many there are. Do you know Kipling's dog poems and Matthew Arnold's famous stanza about a cat? Look them up.

After you have set up your listening post, add an observation gallery. Do a little selective looking about and take new account of what your eyes reveal to you. The lights and shadows, for example, wonderful things to watch! (If you get the urge to sketch, after reading the chapter for tyros in sketching later on, you will become very conscious of light and shade effects.) Have you tried gauging the time by studying the shadows on your wall as they advance and recede? Perhaps you might figure out a sort of sun-dial of your own.

If you start reflecting on time and divisions of time, you could easily go off on a long jaunt, for you would inevitably run into the calendar, a very considerable invention in the annals of man. It may be that we shall have a calendar revision before long, for although most of us regard it as a fixed thing, there has been for some time a fairly well supported movement afoot to change it again. If this bypath should appeal to you, you would

enjoy reading "The Romance of the Calendar," by P. W. Wilson (New York: W. W. Norton & Company, Inc, 1937.)

We make no apologies for being discursive and seeming to make wide and sudden leaps from one topic to another in this chapter. Our proposition is that it is possible to have a lively time all by yourself within the confines of one room by taking conscious account of some of the daily happenings within a small orbit. It is all according to the tenor of your mind.

COME WIND, COME WEATHER

If you have established a window garden, you will certainly be weather conscious. If you want to become weather wise, as well, set up a meteorological station. Haven't you often envied old tars and outdoor folk who can sniff the air, raise a finger and make a few occult passes, then tell with reliable accuracy whether one will need to carry an umbrella tomorrow?

The amateur weather forecaster must operate without the aid of long range information, but there are a number of ways in which it is possible to arrive at fairly accurate predictions by using a few simple instruments, some of which you can make and others which can be bought reasonably in any locality.

The four chief factors in reading weather indications are: temperature, humidity, pressure, and motion. These four things tell the condition of the atmosphere at a given time and place, and this is what constitutes weather.

Regular seasonal changes in atmospheric condition are marked by the shifting of trade wind belts as the sun moves north and south. Irregular changes are caused by "highs" and "lows" in pressure, due to contour of the country, mountain ranges, plains, valleys, and lakes.

Your first weather instrument is, of course, the thermometer. Hang one outside your window, preferably in a sheltered place, and take into consideration whether it gets the direct rays of the sun or if it gets sun at all.

The barometer tells the density of the air by the pressure, which is measured by the number of inches of mercury which the air will support. This instrument is of little use and may actually give you wrong information unless you consult it regularly and keep a record of its readings. (Of course, if you go in for weather forecasting, you must keep a log book.)

The barometer contains a small metal box from which the air has been removed. The sides of the box cave in more or less from the pressure of the air on the outside of the box. The air-pressure, which constantly varies, is called barometric pressure. The side of the box is connected with a needle

that moves back and forth, registering the changes in the pressure. Each time you read the barometer you should tap the glass lightly in case the needle has stuck. Write the reading down and set the extra needle right over the moving needle. This is so that the next time you read the barometer you can tell at a glance whether it has moved up or down.

READING THE BAROMETER

A rising barometer: Rapid rise—unsettled weather. A gradual rise—settled weather. A rise with dry air and cold increasing in the summer indicates wind from the northward, and if rain has fallen, better weather may be expected. A rise with moist air and low temperature indicates wind and rain from the northward. A rise with southerly wind, indicates fine weather.

A steady barometer: With dry air and normal temperature indicates continuance of fine weather.

A falling barometer: A rapid fall indicates stormy weather. A rapid fall with westerly wind, indicates stormy weather from the northward. A fall with a northerly wind indicates storm, with rain and hail in summer and snow in winter. A fall, with increased moisture in the air and heat increasing, indicates wind and rain from the southward. A fall after very calm and warm weather indicates rain with squally weather.

After reading the barometer indications you can see why you need the other instruments mentioned.

THE HYGROMETER

The hygrometer tells the humidity. It consists of two thermometers fastened to a board. You can make one of these for yourself. The reason for the two thermometers is that humidity is arrived at by comparing the temperature of the air with the temperature of evaporating water. Hence, one of the thermometers of the hygrometer is a dry bulb, or household type, and the other has its bulb covered with a cotton wick extending down into a small bottle of water. The two thermometers are mounted on a board and placed upright in a box which has had holes drilled in three sides to allow a free circulation of air, and yet not allow too much wind to strike the wet bulb. This would cool the wet bulb too much and give an incorrect reading. The two thermometers will have to be purchased, but you can make the rest of the instrument, or have someone make it for you who is handy with hammer, saw, brace, and bit. In buying thermometers, go where there is :

selection, look them all over to find out what the average reading is, and buy the two whose readings are nearest to the average.

The wet bulb thermometer gives you the temperature at 100% humidity and the dry bulb the temperature at the humidity of the air. By subtracting the wet bulb reading from that of the dry bulb and consulting the following table you can find out what the humidity is.

Room temp.	Difference between Wet and Dry Bulbs																			Barometer		30.0	
	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21					
68 F	80	76	71	67	62	58	54	50	46	42	38	34	31	27	23	20	16	13					
69	81	76	72	67	63	59	55	51	47	43	39	35	32	28	24	21	18	14					
70	81	77	72	68	64	59	55	51	48	44	40	36	33	29	25	22	19	15					
71	81	77	72	68	64	60	56	52	48	45	41	37	33	30	27	23	20	17					
72	82	77	73	69	65	61	57	53	49	45	42	38	34	31	28	24	21	18					
73	82	78	73	69	65	61	57	53	50	46	42	39	35	32	29	25	22	19					
74	82	78	74	69	65	61	58	54	50	47	43	39	36	33	29	26	23	20					
75	82	78	74	70	66	62	58	54	51	47	44	40	37	34	30	27	24	21					
76	82	78	74	70	66	62	59	55	51	48	44	41	38	34	31	28	25	22					
77	83	79	74	71	67	63	59	56	52	48	45	42	39	35	32	29	26	23					
78	83	79	75	71	67	63	60	56	53	49	46	43	39	36	33	30	27	24					
79	83	79	75	71	68	64	60	57	53	50	46	43	40	37	34	31	28	25					
80	83	79	75	72	68	64	61	57	54	50	47	44	41	38	35	32	29	26					
82	84	80	76	72	69	65	61	58	55	51	48	45	42	39	36	33	30	28					
84	84	80	76	73	69	66	62	59	56	52	49	46	43	40	37	35	32	29					
86	84	81	77	73	70	66	63	60	57	53	50	47	44	42	39	36	33	31					
88	85	81	77	74	70	67	64	61	57	54	51	48	46	43	40	37	35	32					

WINDS AND CLOUDS

Wind is the third important element determining weather and, since it is impossible to have a weather-vane indoors, next best is to have one right outside your window. The velocity of the wind can also be estimated by its effect on surrounding objects.

The Beaufort Scale of Wind Force (Form No. 4062-A—Mis., from the United States Department of Agriculture, Weather Bureau; Washington, D. C.) gives specifications for using the scale on land. (See page 16.)

Beaufort Number	Specifications For Use on Land	Miles per hour (Statute)	Terms used in USWB Forecasts
0	Calm; smoke rises vertically.	Less than 1	
1	Direction of wind shown by smoke drift but not by wind vanes.	1 — 3	Light
2	Wind felt on face; leaves rustle; ordinary vane moved by wind.	4 — 7	
3	Leaves and small twigs in constant motion; wind extends light flag.	8 — 12	Gentle
4	Raises dust and loose paper; small branches are moved.	13 — 18	Moderate
5	Small trees in leaf begin to sway; crested wavelets form on inland waters.	19 — 24	Fresh
6	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty.	25 — 31	Strong
7	Whole trees in motion; inconvenience felt in walking against wind.	32 — 38	
8	Breaks twigs off trees; generally impedes progress.	39 — 46	Gale
9	Slight structural damage occurs (chimney pots and slate removed).	47 — 54	
10	Seldom experienced inland; trees uprooted; considerable structural damage occurs.	55 — 63	Whole
11	Very rarely experienced; accompanied by widespread damage.	64 — 75	
12		above 75	Hurricane

Velocity and direction of the wind are important factors and have definite weather results, so take your observations frequently and enter them carefully in your Weather Log.

Wind from the southwest	Rain
Changing from the southwest to east	Storms to south with rain
Wind from the south	Rising temperature
Changing from south to northeast	Rain or snow
Winds from the west	Fair
Changing from south to northwest	Clear and colder
Wind from the north	Falling temperature
Changing from north to west	Clear and dry
Wind from the east	Stormy
Changing from east to southeast	Rain soon

Mackerel skies and mares' tails
Mean that great ships will carry small sails.

Cloud formations tell the weather-wise a great deal about what to expect, so it is important to know something about them. In most parts of the United States only clouds in the western part of the sky are important. There are thirteen types of clouds and only four are familiar to most people. An Englishman by the name of Luke Howard gave them the Latin names by which they are known today. You will probably recognise the following clouds:

Cirrus, meaning lock or curl, high white delicate wisps. Against a bright blue sky they indicate a "high" and clear weather. Against a grey-blue sky, clouds may thicken with a "low" and rain or snow may be on the way. Cirrus, cirro-stratus, alto-stratus, stratus and nimbus clouds indicate generally an approaching "low" with rain or snow.

Clearing is indicated by fracto-nimbus and fracto-stratus.

Cumulus clouds are probably recognised by everyone. The cumulus or "woolpack" as it is often called is the best known and most beloved of all cloud formations. It usually brings fair weather with some wind. Cumulus clouds are seen in white heaps against a brilliant blue sky. A "thunderhead" is made up of overgrown cumulus clouds, and it will usually bring a storm within two or three hours.

There are modifications of the cumulus, the chief one being cumulo-nimbus which heralds a thunder storm. This type is seen first in large cumulus

formations that become black and move rapidly; wind, rain, thunder, and lightning accompany them. These are summer clouds, and a rainbow is often seen as they are disappearing.

Daily weather maps are printed in many local newspapers and weather reports are given on the radio daily. The United States Weather Bureau, with its elaborate chain of observer and recorder stations prepares a daily weather map which one may subscribe to at a reasonable rate. It is interesting to know that the bureau receives valuable reports from ships at sea and each day a special airplane flight is made to a height of 20,000 feet to secure weather information for pilots. The five large weather stations are located at Washington, Chicago, New Orleans, Denver, and San Francisco.

Write to the station nearest you for weather maps and other data.

THE HEAVENS FROM YOUR WINDOW

Your own patch of sky, as framed in your window, can give you many an evening's entertainment, if you take the trouble to acquire even a slight reading knowledge of what is going on overhead.

From fifty to one hundred and sixty degrees of sky can be seen from an average window. Charting what is visible from one point, learning to identify the heavenly bodies that pass that way and to note their movements, can become an absorbing nightly occupation.

Most of us take the solar system completely for granted, as we do all of the other wonders of the world, thereby depriving ourselves of experiences that would stretch our minds and give us new perspectives.

The earth on which we live is only one of nine known planets revolving around the sun—the sun we know, that is, for physicists tell us of greater suns with their satellites in the far reaches beyond the range of any telescope. Hundreds of thousands of lesser lights called asteroids are circling with the planets as they make their rounds.

“A million torches lighted by Thy hand
Wander unwearied through the blue abyss—”

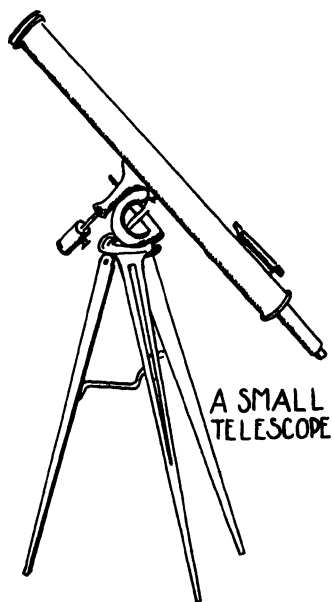
wrote the Russian poet, Derzhavin, awed by his contemplation of the cosmic spectacle.

Reducing things to facts and figures sometimes robs them of the element of wonder, but not so with the celestial bodies. It seems even more wonderful that so much could have been learned about them when their distance

is expressed in terms of hundreds of thousands and even in millions of light years.

How the heavens were charted, who discovered the stars, the planets, and the constellations, and how they came by their names, are questions that might engage, one would think, the minds of all of us more than they do, since we share space with them.

Very recently there was published in England a book called "A Better Sky," by Mr. A. P. Herbert, a member of Parliament and a well known writer, in which he calls for a renaming of the heavenly bodies. The Arabic, Greek, and Roman names have discouraged lay folk from getting acquainted with them, he believes, thus "hindering the spread of knowledge and hiding the glory of the stars." He has made a chart of his own, with our old friend, Ursa Major—the Great Bear—now become Great Britain, and the stars of which the constellation is composed bearing the new names of Shakespeare, Pitt, Handel, Reynolds, Johnson, and so forth. Cassiopeia's Chair would be called the United States, with Washington, Jefferson, Lincoln, Roosevelt, Paul Jones, and Grant the individual stars. There is a Children's Corner in Mr. Herbert's heavens, with Peter Pan and Alice among the inhabitants, and the chief vocations of man have their constellations. It is good reading, half joking, half serious, and it would be a lively introduction to a study of your own bit of overhead.



Anyone who takes an interest in astronomy can get suggestions and study aids from the following places: The Hayden Planetarium, New York; Fels Planetarium, Philadelphia; Buhl Planetarium, Chicago; and the Griffith Planetarium, Los Angeles. There are many popular books on astronomy in the public libraries, as well as a great literature of advanced works by famous physicists. In some localities telescopes can be rented. But even without a telescope you can have a splendid time studying the stars from your window.

SOME GREAT NATURALISTS

A list of all the great naturalists and their works would fill a volume. There are a few who are particularly good reading. You might find them good companions if you have not already made their acquaintance. Henry David Thoreau has always a steady audience, but not as large a one as he deserves. (Gandhi, by the way, is said to have got his idea of civil disobedience from him.) John Burroughs and W. H. Hudson you might enjoy, too. And there is a remarkable book written by an eighteenth century English country parson, Gilbert White—"Natural History and Antiquities of Selborne." His area was very limited. He never went more than a few miles from his home in any direction, but he knew every pebble and every creature within his boundaries. What his rating as a scientist would be today is unimportant. He was on intimate terms with the world immediately about him and by his record one gathers that he had a very good time.

2. CHIP CARVING— ancient and modern craft

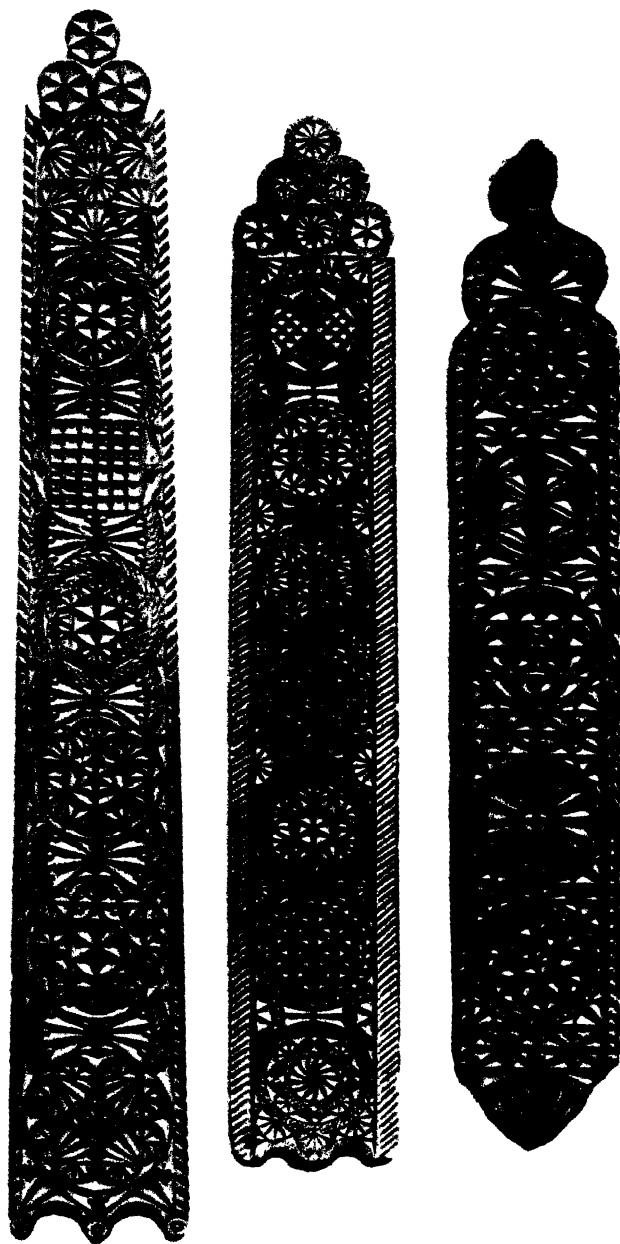
CHIP CARVING is a decorative device which has been practised by many primitive peoples. In most museums of any consequence will be found examples of Dutch, Scandinavian, Egyptian, African, and Chinese work (See Plate I and Plate II), showing the scope of this craft, which at first consideration may seem to be mere child's play. It can, indeed, be that, too. But it has intricate and various possibilities and the more mature craftsman will find enough challenge in it to satisfy his urge for artistic invention and for exercise and development of his skill.

Precision and patience are requisites, and if you haven't these qualities to begin with, chip carving will be just the discipline for you. Not only will you be able to add a few notches to your character-stick, but there will be something concrete to show for your efforts, for you will be able to make many beautiful and useful things for yourself and your friends. The illustrations at the end of the chapter will give you a number of interesting suggestions to start with.

GEOMETRIC DESIGN IN CHIP CARVING

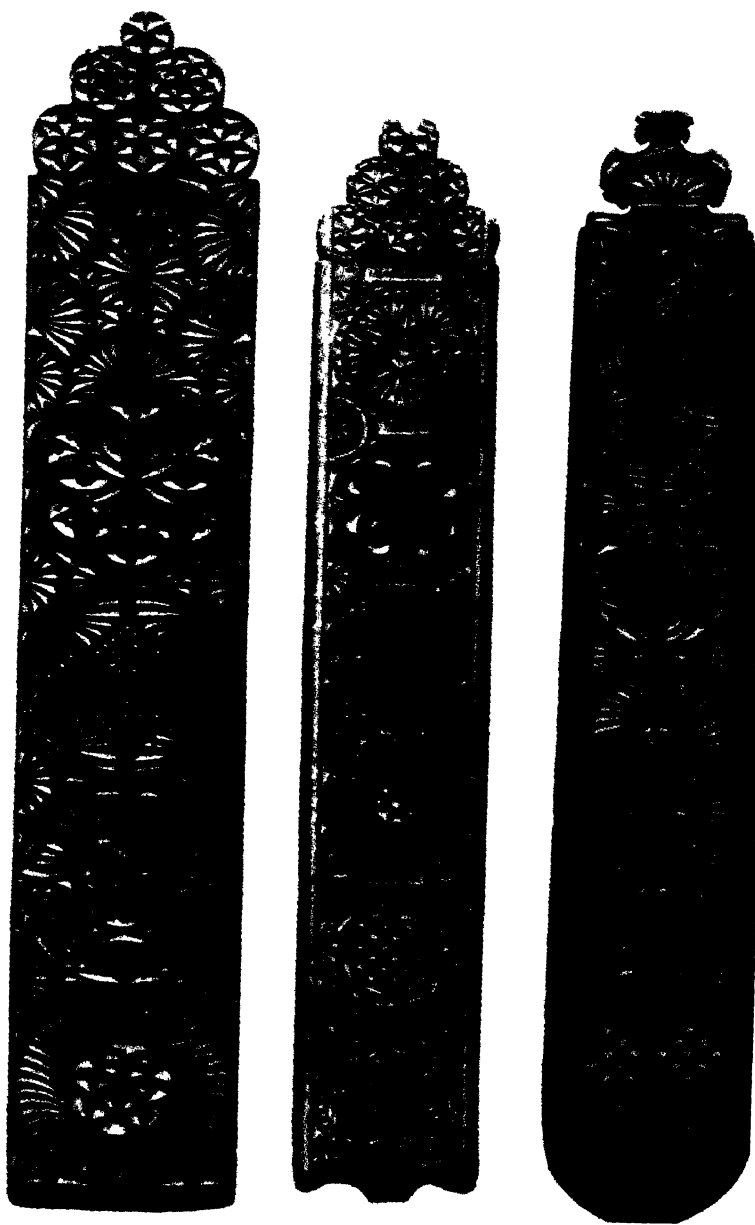
Most chip carving designs are based upon geometric patterns. The "chips" themselves are triangular pieces of wood removed from a board with stick and slicing knives. By arranging the patterns of these chips we arrive at complete designs.

The use of geometric schemes makes possible the creation of an infinite number of patterns by anyone capable of using a ruler and a compass. One



Courtesy of the Metropolitan Museum of Fine Arts, New York City

These mangle boards, examples of the finest chip carving, were done by Dutch masters of the art. They can be seen in the Metropolitan Museum,



Courtesy of the Metropolitan Museum of Fine Arts, New York City

Dutch mangle boards decorated with chip carving.

does not have to be an accomplished artist or a mathematician to be able to design for chip carving. It is, therefore, an excellent means of expression for those who "can't draw anything" yet feel that they would like to do something entirely on their own and not copy what someone else has done.

A circle, its diameter and radii are easy to visualise and understand if they are part of a design. They come to life for us. This also applies to other shapes. Chips may be equilateral or isosceles triangles or chords. The actual cutting of these shapes makes them something concrete, something tangible, and not just lines on a piece of paper.

The instruments used in laying out geometric designs are few. Some of them can be improvised.

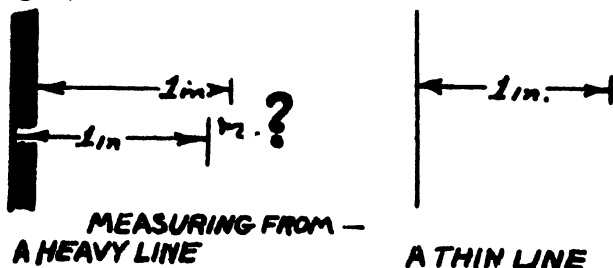
Ruler. Preferably a thin one, graduated in thirty-seconds. Mechanics steel scales are ideal and can be purchased for as little as ten cents. Wooden rulers are usually not graduated finer than sixteenths of an inch, and they have a metal edge that keeps the pencil too far from the graduations for accurate small work.

Compass. The pencil compass should have a firm joint that does not slip or jerk when being adjusted. When you buy a compass, try it and be sure that it always makes closed circles. If the joint slips it will make spirals.

Try-square. This is not essential but quite useful in drawing squares or rectangles. A small one such as the carpenter uses is sufficient, although a square piece of cardboard or a draftsman's celluloid triangle can be substituted.

Protractor. This is another desirable but non-essential tool, useful for dividing circles and drawing diagonal lines. Half circular celluloid protractors can be purchased at the five-and-ten-cent stores; the steel ones with an adjustable blade cost about one dollar. The adjustable protractor can also be used for a "T" square or try-square.

Pencil. This should be a 2 to 4H drawing pencil. Softer pencils do not hold their points and they make such broad lines that accurate work is almost impossible. Remember, theoretically "a line has only one dimension—length." (Fig. 1.)



In drawing any kind of figure we must have a base or centre line—something to measure from. The first step, then, is to decide which line we are going to use and where to place it in relation to the box or board or whatever we are working on. If the board happens to be square or to have a straight edge we can use that for a base line.

If the board has no straight edge or if the design is going to be on the bias we have to draw our base line.

If the design is going to be rectangular, the next step is to draw lines perpendicular or at right angles to the base. When an edge of the board is used for a base line, a try-square placed with its handle against the edge will indicate lines at right angles to the edge and all that is necessary is to make a pencil line along the edge of the block. (Fig. 2.)

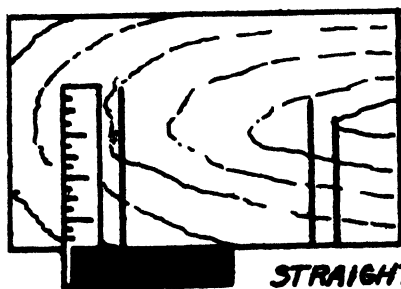
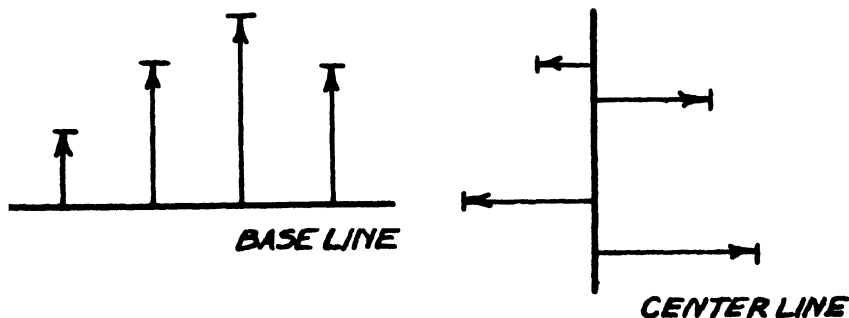


Fig. 2

**STRAIGHT EDGE
AND TRY SQUARE**

When the edge of the board cannot be used for a base line we must resort to the compass to erect lines perpendicular to the base line. Place a dot on the base line where the perpendicular is to be, and with this dot as a centre set the compass for any convenient radius and draw an arc on the line each side of the dot. Open the compass a little further and use these arcs as centres to draw two more arcs crossing each other above or below the base lines. A line drawn through the original dot and the crossing arcs will be perpendicular, or at right angles to the base line. (Fig. 3A.)

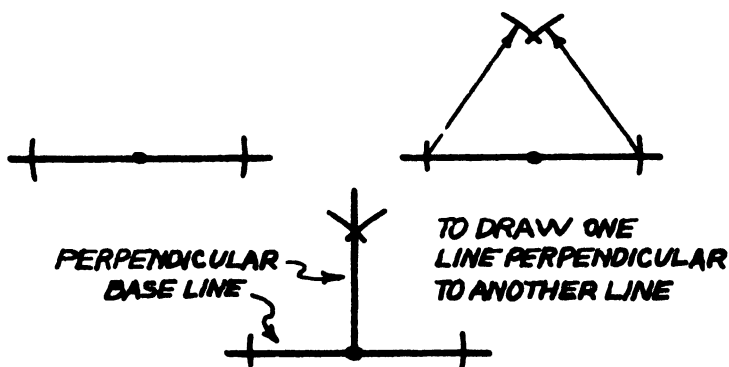


Fig. 3 a

To complete our rectangle draw lines parallel to the base and perpendicular lines anywhere desired. (Fig. 3B.)

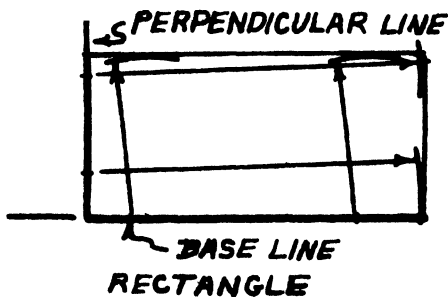
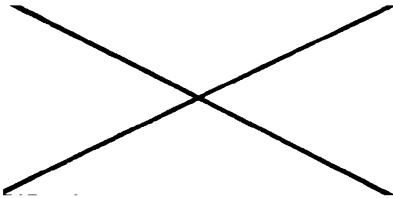


Fig. 3 b

To find the centre of this rectangle, draw diagonal lines from corner to corner. Where they cross indicates the centre of the rectangle and we have the beginning of a design for chip carving. (Fig. 4A.) The next step will be to divide up these large triangles formed by the diagonals within the rectangle into smaller ones to form our chips. (Fig. 4B.)



**FINDING CENTER OF A
RECTANGLE**

Fig. 4 a

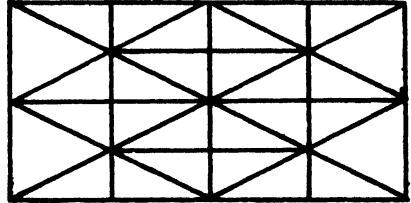


Fig. 4 b

To Bisect a Line. Let us stop for a moment here and talk about another problem that you may meet and that can be solved in almost the same way as by drawing one line at right angles to another. That is, to divide a line in half, or to bisect a line of any length. Of course, you can measure the length of the line and take half the distance, but sometimes the line will be of an odd length and you run into awkward fractions. Suppose the line is from A to B. Set the compass for anything more than half the distance. Then place the needle of the compass at one end of the line and then the other, drawing arcs above and below the line so that they cross each other. A line drawn through these crossing areas will bisect A-B, and, incidentally, be perpendicular to it. (Fig. 5.)

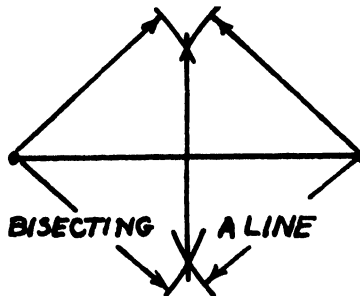
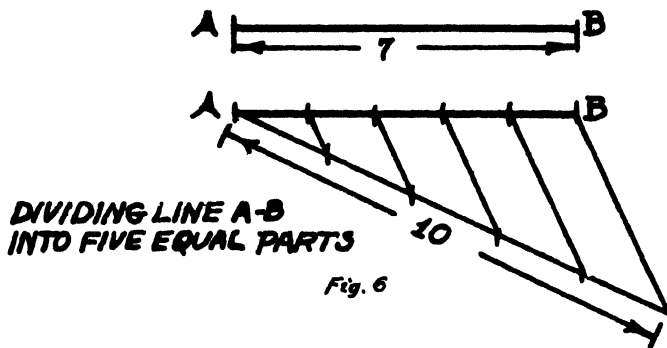


Fig. 5

**BISECTING
A LINE**



Odd Divisions. Another problem of similar nature but of different solution is that of dividing a line into a number of equal parts. Sometimes this is difficult. If the line is ten inches long and you want five divisions the answer is easy. Each division will be two inches long. But suppose the line is seven inches long. How are you going to measure one and two-fifths inches on a ruler calibrated in one-thirty-seconds? Let's take our old friend, line A-B again. Seven inches long this time. We want to divide it into five parts. Draw a line that can be divided by five from A to any convenient angle. (Fig. 6.) Let us take ten inches (it could just as well be fifteen or twenty, etc.) Divide this new line into five parts. Connect the end of it to B and draw lines parallel to this connecting line through the five divisions. They will divide A-B into five even parts.

Parallel Lines. We have mentioned parallel lines several times and they are used often in chip carving designs. If your board is square they are easy to draw with the try-square. (Fig. 7A.)

Otherwise you have to measure with the ruler or compass at two positions on the original line and draw the parallel line through the points of measure. If there are many lines to draw, set the compass and pace them off across the board. Be sure the pencil is sharp, though, or there will be an accumulative error caused by the thickness of the pencil lines. (Fig. 7B.)

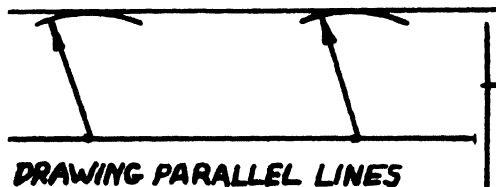


Fig. 7a

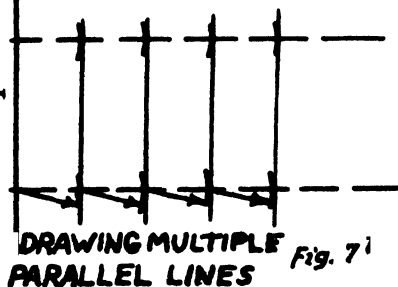


Fig. 7b

Circles. Many chip carving designs are based on circles. Someone once remarked—"A circle has two sides. The inside and the outside." It is the inside we are concerned with. As a matter of fact, a circle has no sides, or an infinite number of sides. Fortunately for us, we are interested only in the other parts of a circle. Its *diameter*, which is the longest line that can be drawn through it, passes through the center. (Fig. 8.) Incidentally, the diameter times 3.1416 gives the length of the circumference as if it were straightened.

The Radius, which is half the diameter. There can be a great many radii in one circle! (Fig. 9.)

The Arc, or any part of the circle. (Fig. 10.)

A Segment—bounded by two radii and one arc. (Fig. 11.)

The Chord—an arc with a line from horn to horn. (Fig. 12.)

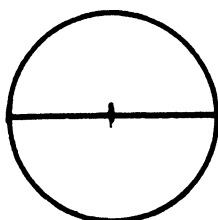


Fig. 8

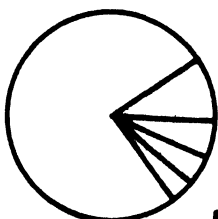
DIAMETER

Fig. 9

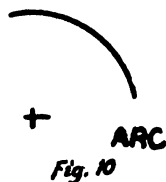
RADI/

Fig. 10

ARC

Fig. 11

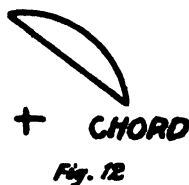
SEGMENT

Fig. 12

CHORD

The circle is divided into 360 degrees, so we can use a protractor and figure out all sorts of angles. A half circle is 180 degrees, or a straight line. A quarter circle is 90 degrees or a right angle. An eighth circle is 45 degrees or an acute angle, and one-third of a circle is 120 degrees or an obtuse angle, and so on. If we have no protractor we can still divide a circle a number of ways by using a compass and ruler.

The Hexagon. To divide a circle into 3, 6, 12, 24, etc. parts. This also makes an equilateral triangle and a six-pointed star. Draw circle and diameter, A-B. Without changing the compass setting (the radius) use A and B as centres and draw arcs cutting the circle above and below the diameter. (Fig. 13A.) The circle is now divided into six parts. If you connect them all together with straight lines you will have a hexagon. (Fig. 13B.) If you connect alternate ones you will have an equilateral triangle. (Fig. 13C.) Connect the other alternates and you will have a six-pointed star. (Fig. 13D.) Bisect the six sides and a twelve-sided figure will result. (Fig. 13E.)

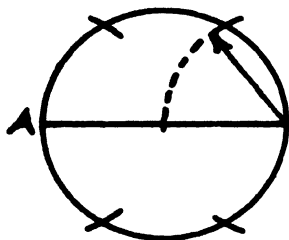


Fig. 13 a

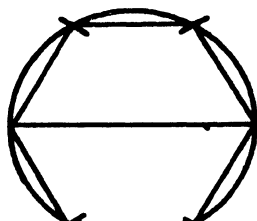
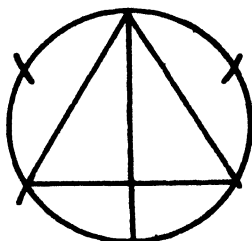


Fig. 13 b

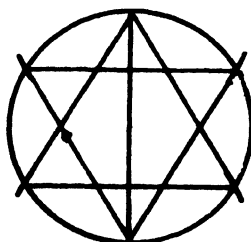
HEXAGON



**EQUILATERAL
TRIANGLE**

Fig. 13 c

Fig. 13 d



**SIX POINTED
STAR**

**BISECT ONE SIDE
OF HEXAGON**

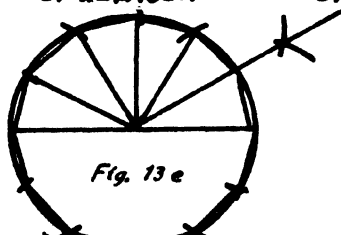
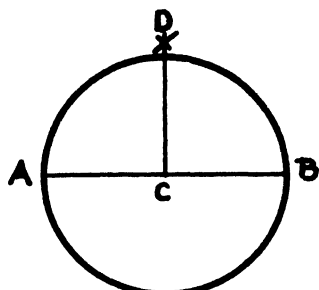
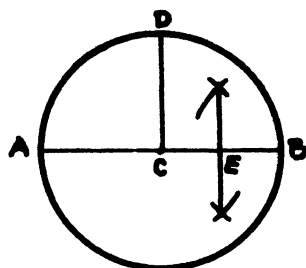


Fig. 13 e



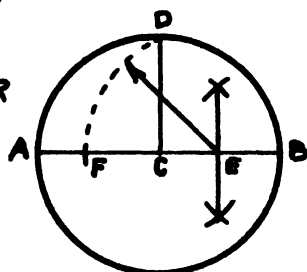
**PERPENDICULAR
RADIUS C-D**

Fig. 14a



BISECT C-B E

Fig. 14 b



DRAW RADIUS E-D F

Fig. 14 c

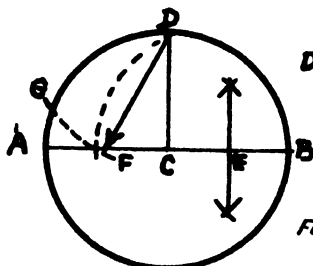


Fig. 14 d

**DRAW RADIUS D-F G
G-D IS $\frac{1}{5}$ OF THE
CIRCLE**

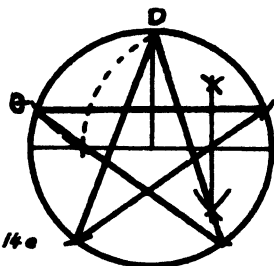


Fig. 14e

**PACE D-G AROUND
CIRCLE. CONNECT
ALTERNATE POINTS
FOR FIVE POINT STAR.**

The Pentagon. To divide a circle into 4, 10, 20, 40, etc. parts. This is perhaps the hardest of them all, but very important, as it is the basis for a five-pointed star.

Draw the circle and diameter A-B again. Now add a perpendicular radius C-D (Fig. 14A.) Bisect C-B and call the point of bisection E. (Fig. 14B.) Set the compass needle on E and open it to D. Draw an arc through the other side of the diameter and call that point of intersection F. (Fig. 14C.)

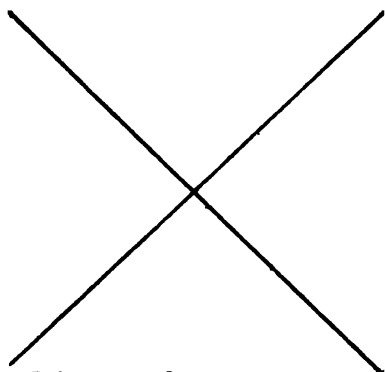
Now set the compass needle on D and open it to F, then draw a little arc out to the circle at G. (Fig. 14D.) Don't change the compass setting, as it is now set for one-fifth of the circle. D-G is one-fifth of the circle, and you can get the other four points by pacing that distance around the circle starting at D or G. (Fig. 14E.)

A pentagon is made by connecting these five points of intersection, and a five-pointed star by connecting alternate points just as one did in making a triangle on a hexagon.

The Octagon. To divide a circle into 4, 6, 16, 32, etc. parts.

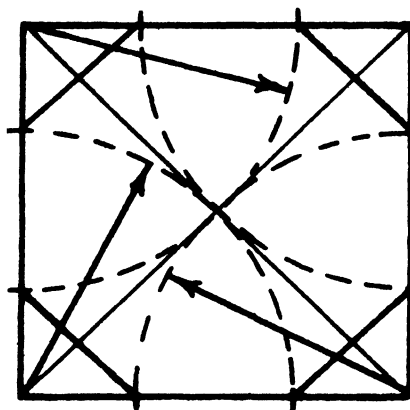
This is really easier to do with a square, so let's start that way.

Draw a square the size the octagon is to be. Draw diagonals. (Fig. 15A.) Set the compass for half of one of the diagonals. Place the compass needle in one corner and draw an arc from one side to the other of the square. Repeat this at each corner. (Fig. 15B.) The four sides of the square are four alternate sides of the octagon, the other sides are made by drawing lines diagonally across the square from arc to arc. Put a circle around it if you want one. (Fig. 15C.)



SQUARE WITH DIAGONALS

Fig. 15 a



SHOWING ARCS

Fig. 15 b

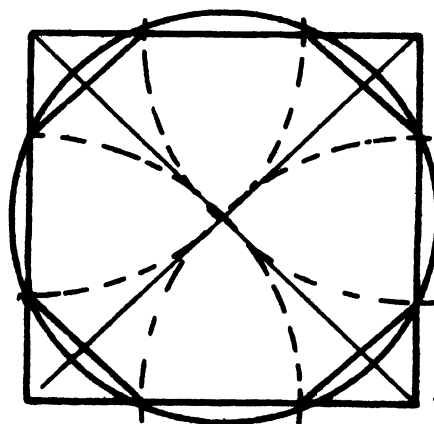


Fig. 15 c

OCTAGON IN CIRCLE

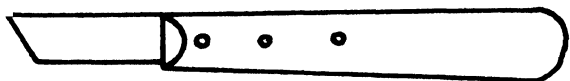
WOODS USED FOR CHIP CARVING

Basswood is by all means the best medium for chip carving. It is soft and workable but fine-grained, and it finishes well. The chips fly out when you make the cuts, and it is not inclined to splinter. Pine can be used, and among the better woods, Brazil satin and applewood are recommended, the first for its lovely grain, the latter for its clean, light colour. Basswood, however, (which, by the way is from the linden or lime tree) is easy to procure in most localities and it is much to be preferred for beginners. It comes usually in widths up to eight inches, so for large articles, such as a chessboard, you will have to do some gluing or hingeing. In thickness it runs from three-sixteenths of an inch in the standard sizes up to an inch.

Harder woods which can be used are walnut and mahogany, but they are difficult to carve and definitely for the accomplished craftsmen. Thoroughly seasoned, well-dried lumber is necessary. If a piece of lumber feels sticky during carving, it indicates that the wood is not dry enough.

TOOLS

There are three types of knives to be had for chip carving and you will need at least two: a stick knife (Fig. 16) and a slicing knife. (Fig. 17.) A stencil knife (Fig. 18) can also be used. There are just two operations—outlining (with the stick knife) and cutting or slicing (with slicing or stencil knife). (Fig. 18.) For really fine work, get one of each kind. Of course, if it is impossible for you to get one of these professional types of knife, you can use a razor blade as an emergency tool. A clever and ingenious worker can achieve creditable results with such a blade, but the process is more tedious and difficult, as can be readily grasped from studying the illustrations.

*Fig. 16**Fig. 17*

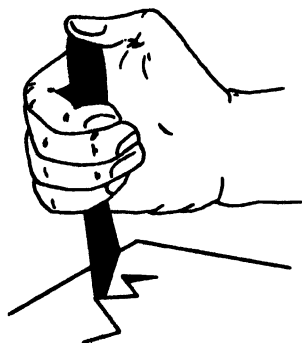


Fig. 19

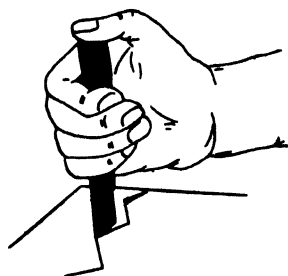


Fig. 20

TECHNIQUE

Assuming that your design is drawn on your block, take the stick knife, being sure to hold it in the manner illustrated in Figure 19. The position of the thumb is important. Place the top of the knife at the apex of the triangle, and press it in to whatever depth cut you wish to make. Now (Fig. 20) turn your hand slightly to the right and press the side of the blade slant-wise along the right side line of the triangle. Repeat this operation along the left side of the triangle. You want to have a graduated slope and not a gouge. Next take a slicing or stencil knife, holding it with your hands as shown in Figure 21. The left index finger controls the blade and does all the work. The two middle fingers of the left hand are bent under so that they will not shadow the work. Figure 22 shows the use of the cutting knife in removing the chip. You start always from the original side line of the triangle and go all the way across until you get the desired depth, otherwise your cut will not be clean and smooth. (Fig. 23.) It usually takes two cutting operations to remove one chip, at least in the early stages. This is the gist of the whole procedure, however, simple or intricate though your patterns may be.

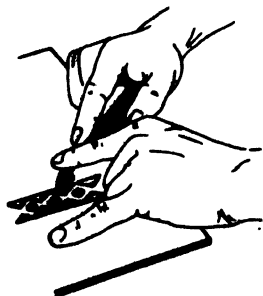
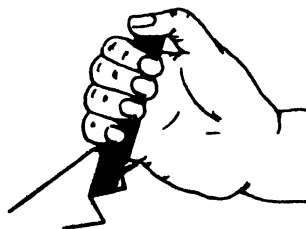


Fig. 21

Fig. 22



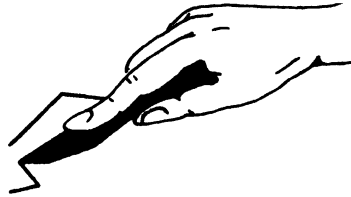
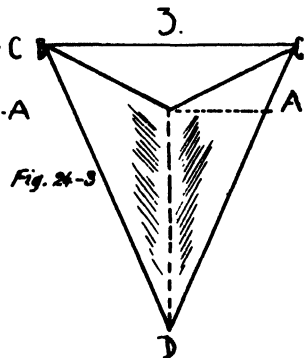
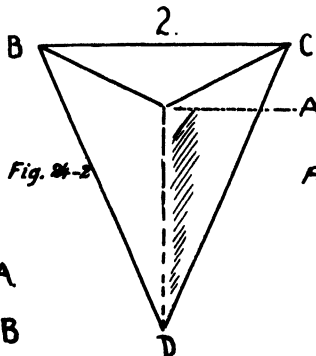
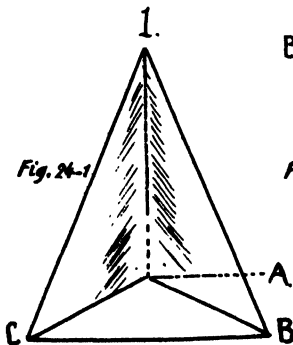


Fig. 23

THE DOUBLE CUT

The double cuts shown on pages 38, 39, 40, 41, 42, 43, and 44, enable the chip carver to elaborate and refine his work. To make a double cut the procedure is only slightly different than for the single triangle pattern.

Begin the double cut at the point marked "A" in Figure 24-1. The base of the triangle should be towards you. With the cutting knife make an incision from A to B, and another from A to C. Then turn your work around (Fig. 24-2) and make an incision along the dotted line, A. to D. With your slicing knife, beginning at the right side of the long incision, take out the first long chip. Then take out the second long chip. (Fig. 24-3.) It will require two slices to get out each chip, and perhaps a third for making the cut clean. Be careful not to splinter the place where the apex of the small triangle juts into the base of the larger one.



FINISHING THE WOOD

There are several ways of finishing the wood. You can have a monotone, or colour parts of the design.

The simplest way to arrive at an effective finish is to buy a tube or tubes of oil paint in whatever colours you like: burnt umber, burnt sienna, mahogany, walnut, etc. Mix the oil paint with turpentine and rub it on the wood with a rag that will not leave lint. The corners of the triangle will have to be treated with a brush. When the paint has thoroughly dried, give it a coat of shellac. Sandpaper this, and shellac it once more. For a really good finish, give it a third coat of shellac. Sandpapering is an important part of all wood work. You should always begin by sandpapering the wood and then give it a good final going over with the sandpaper before polishing. A good floor wax makes the best finish for your work. A soft silver brush or a shoe brush will do a good polishing job. If you do not mind using your hands rather harshly in a good cause, give the final touches with the palm of your hand. The warmth and friction will give your article a satiny gloss.

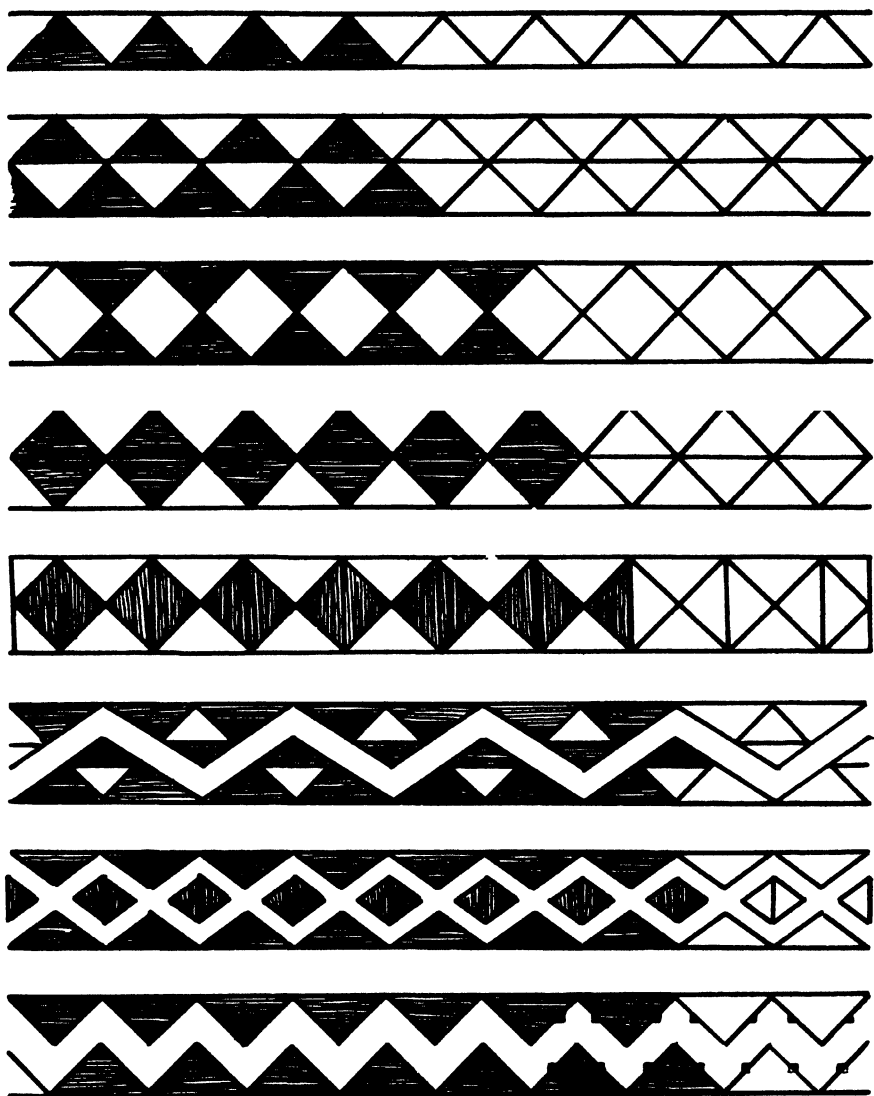
Where you are colouring some parts of the design and using a natural finish for the rest, use a brush to apply the colour and let one colour dry thoroughly before painting in the next one.

SOURCE MATERIAL

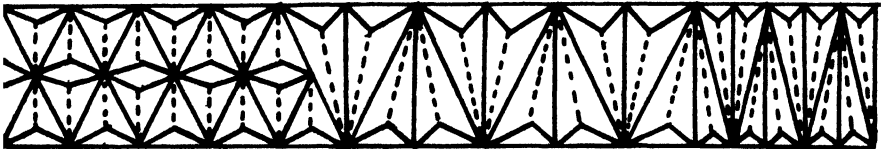
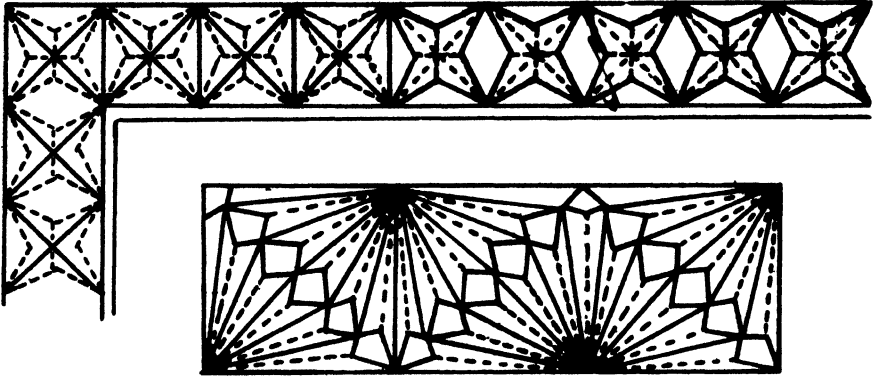
The designs shown in the following plates convey some idea of the wide possibilities of chip carving. They illustrate all types of design and by giving rein to your creative instinct you can adapt the many motifs and get from them inspiration for hundreds of new patterns. You will not be satisfied with this, however, if you really become a skilled chip carver. Libraries and museums will yield plenty of material if you have access to them, and you will also get ideas from such things as glassware, old samplers, bits of lace, etc.

BIBLIOGRAPHY

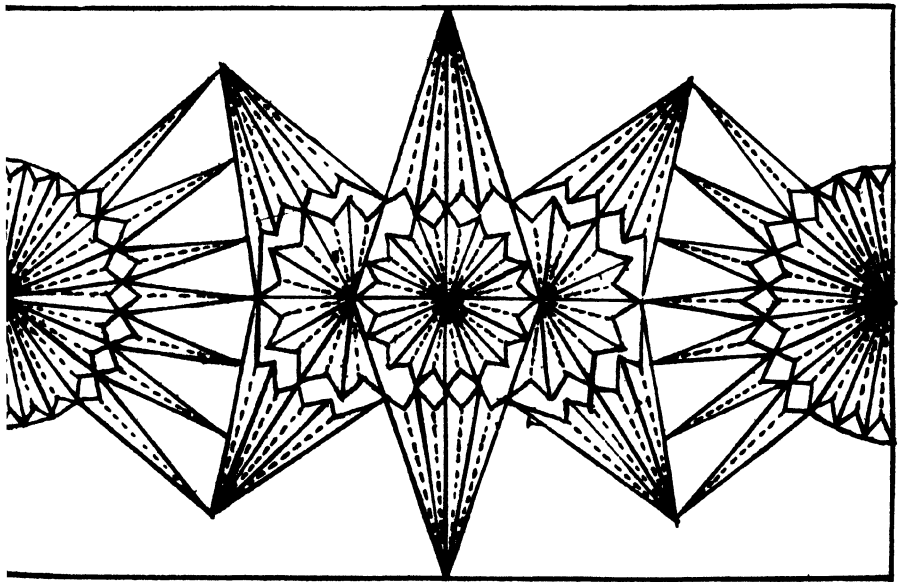
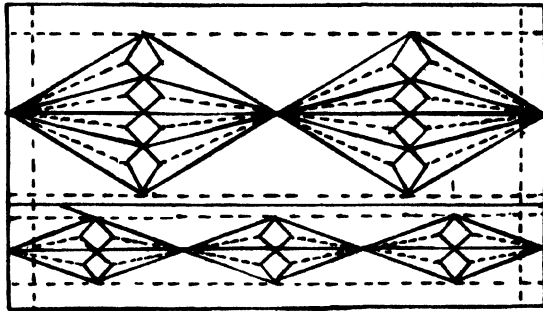
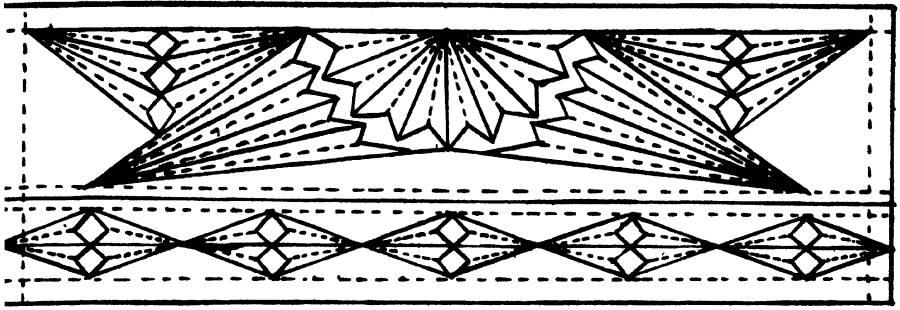
MOORE, HARRIS W., *Chip Carving*. Peoria: Manual Arts Press. 1925.



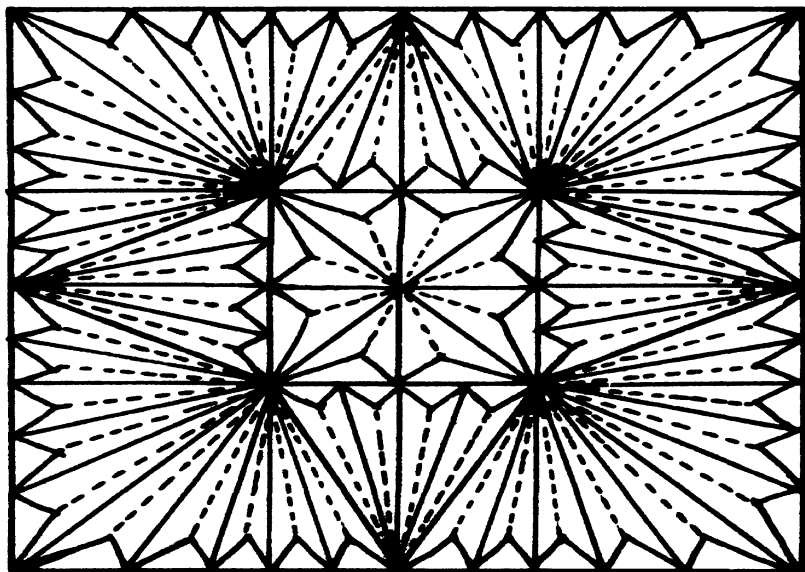
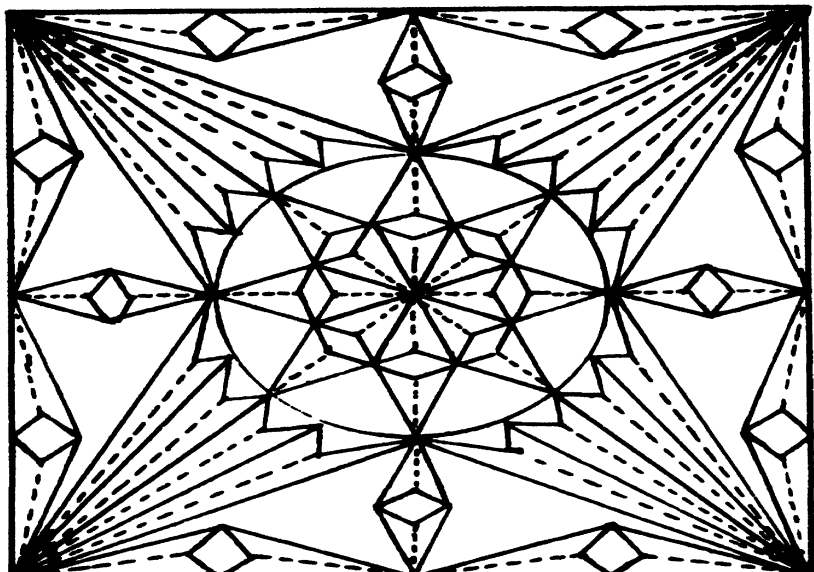
Single triangle cuts in border designs. Note the shaded parts. These are the parts to be cut out. Before you carve an object, get your hand in by practising these elementary cuts. Take a piece of basswood the size of the illustration or larger, and try all of the cuts shown above.



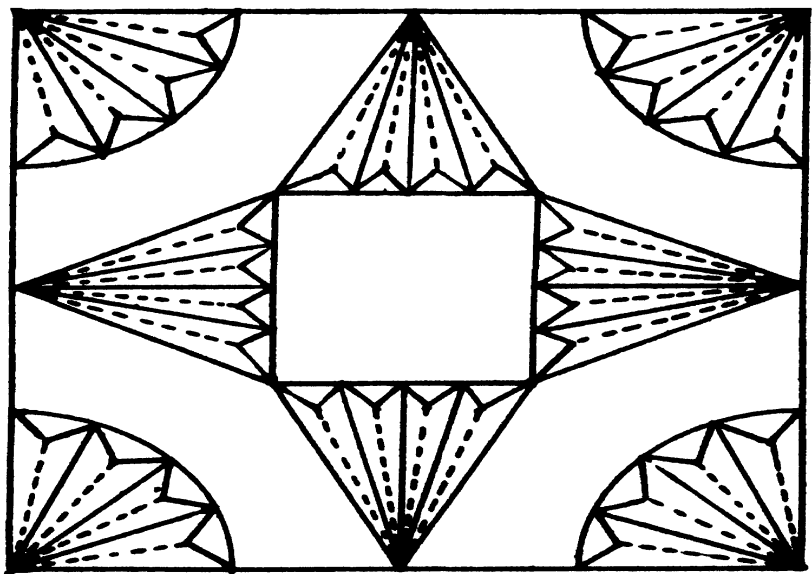
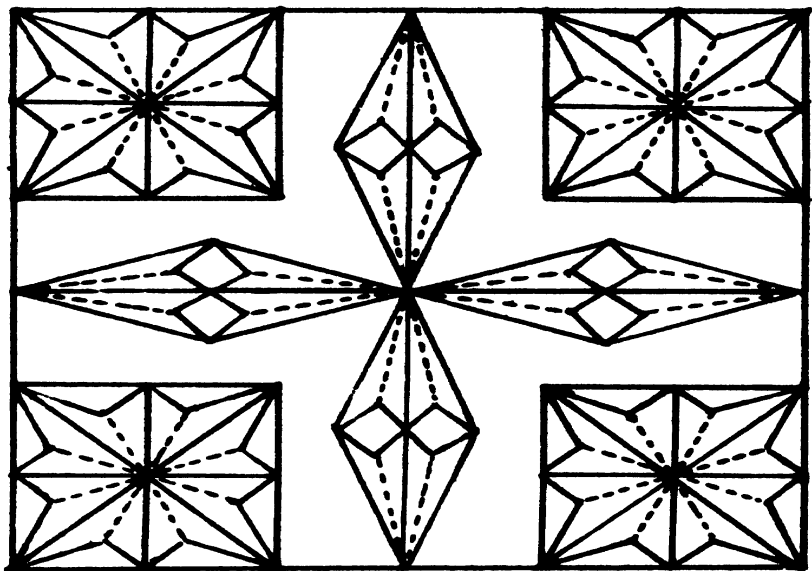
Double triangle cuts, also for borders. Make another sampler of these more intricate patterns. The dotted lines are the cutting lines. The unbroken lines are the parts that will appear raised in the finished work.



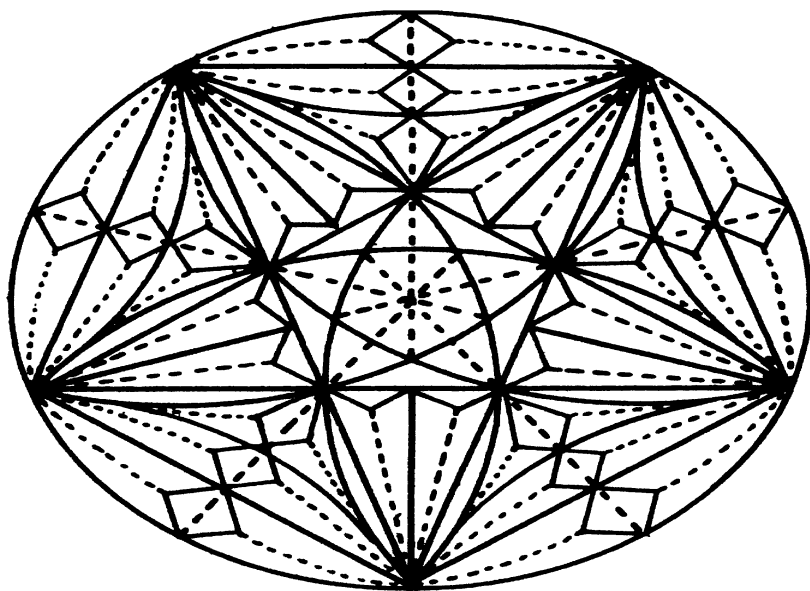
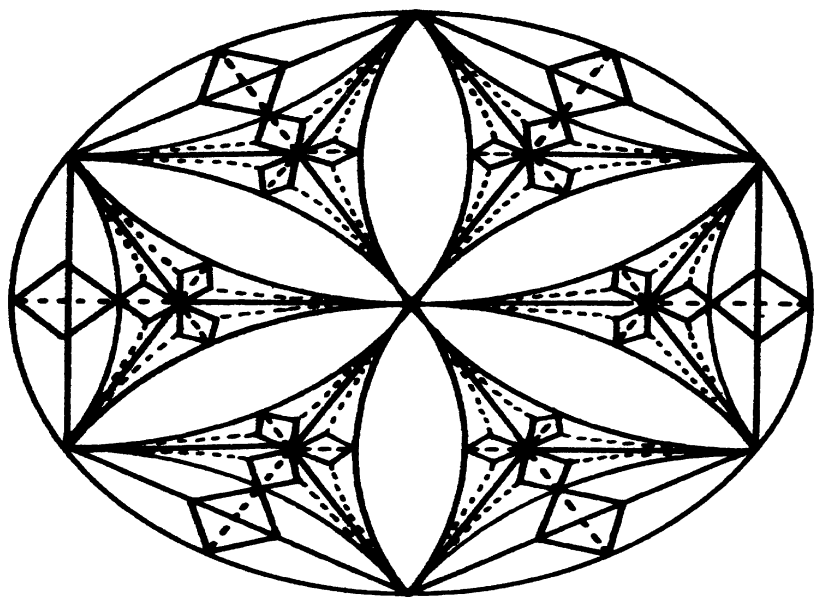
Double cuts. Developments and possibilities derived from the first simple triangle. You can use parts of these designs, adapting them to your project.



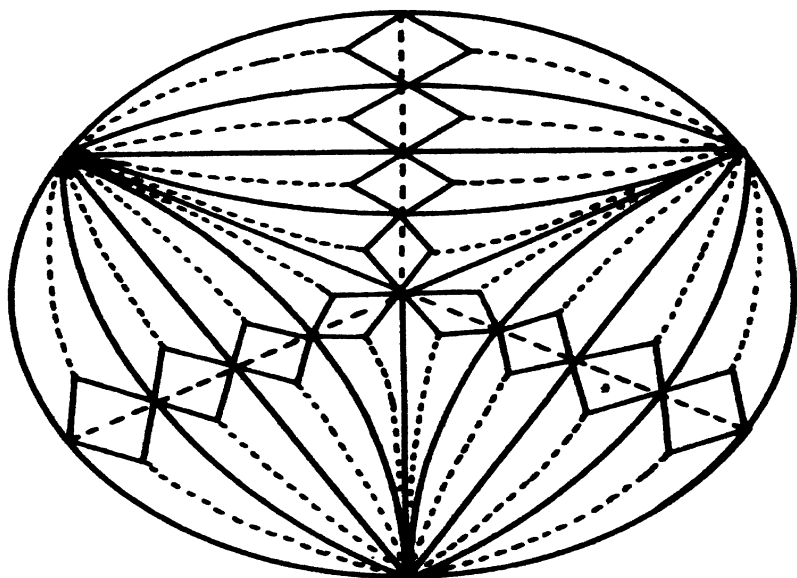
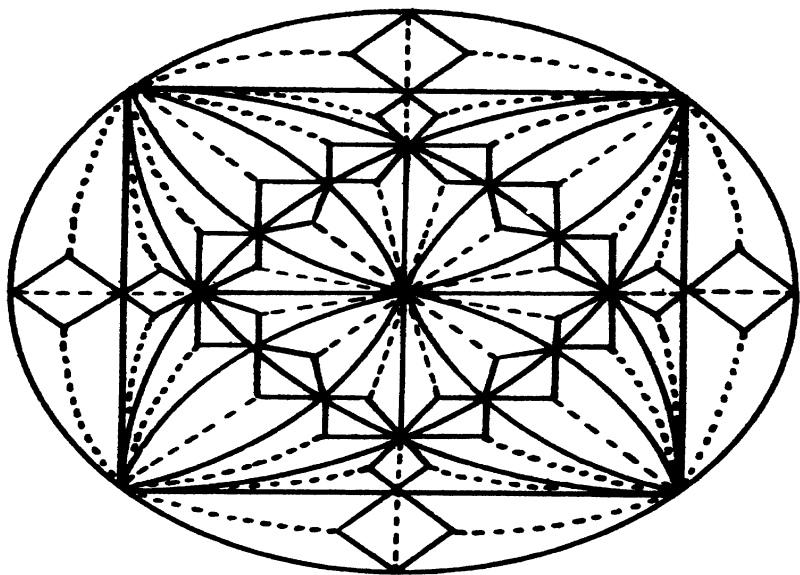
Double cuts.



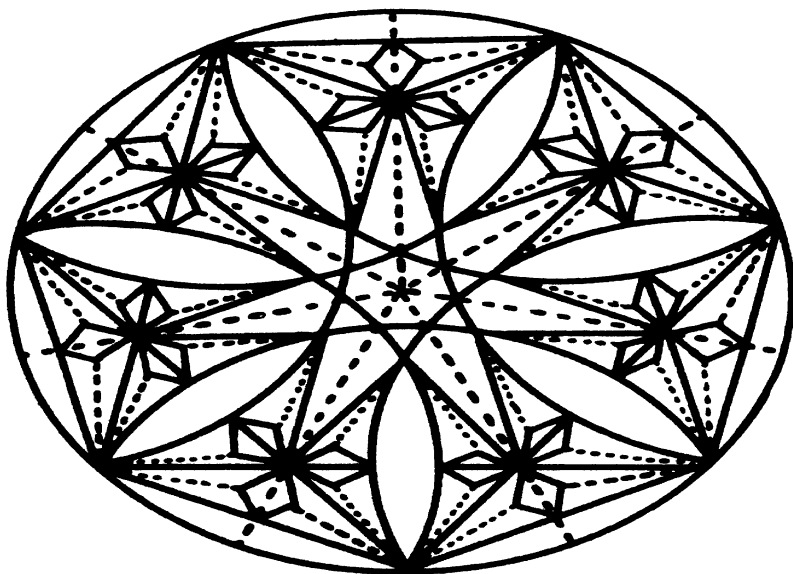
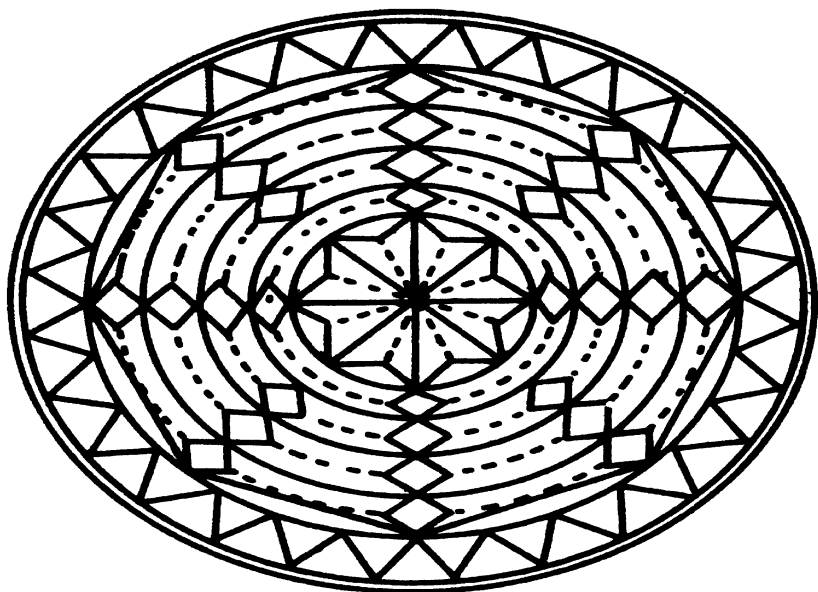
Double cuts.



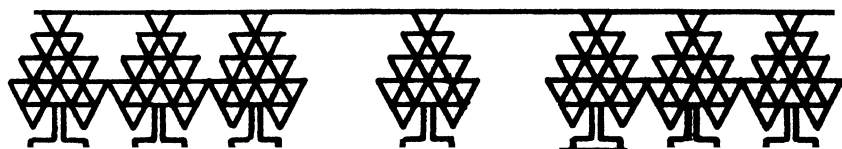
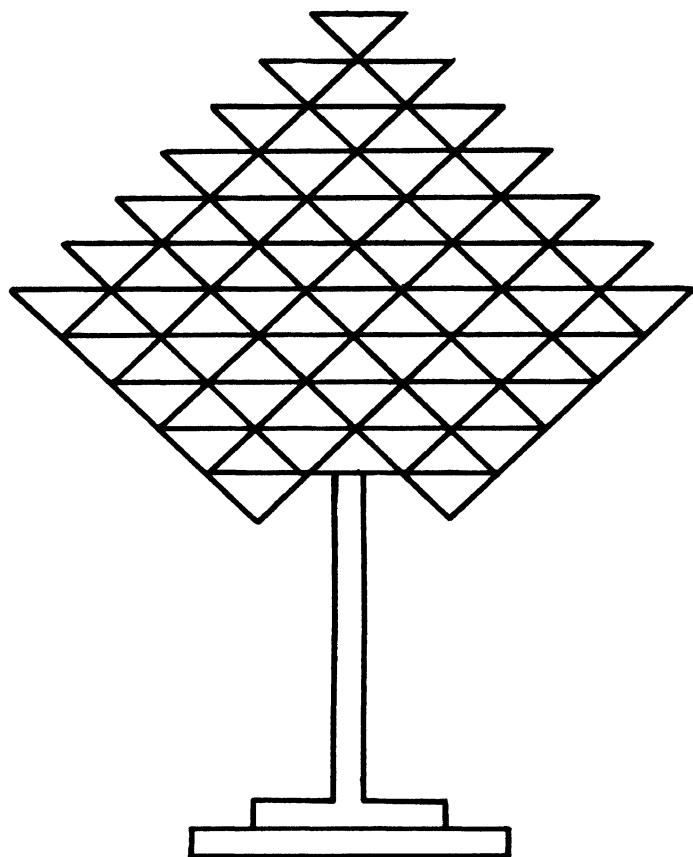
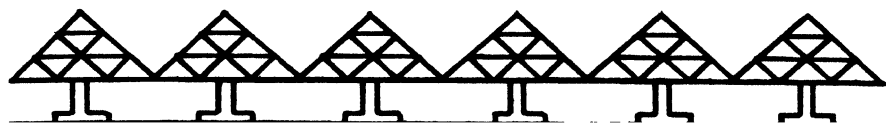
Double cuts.



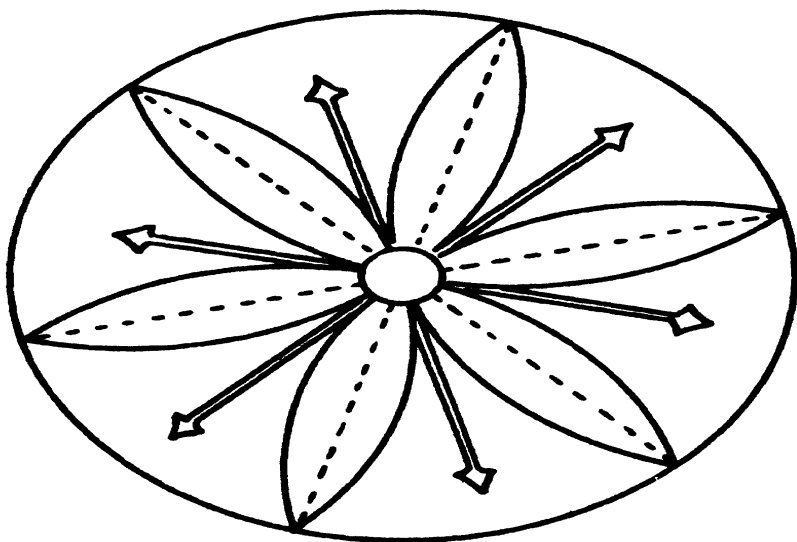
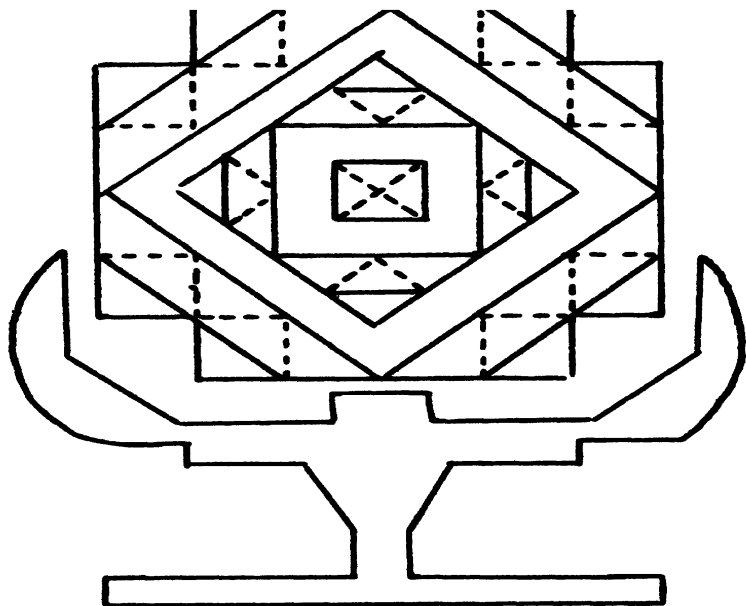
Double cuts.



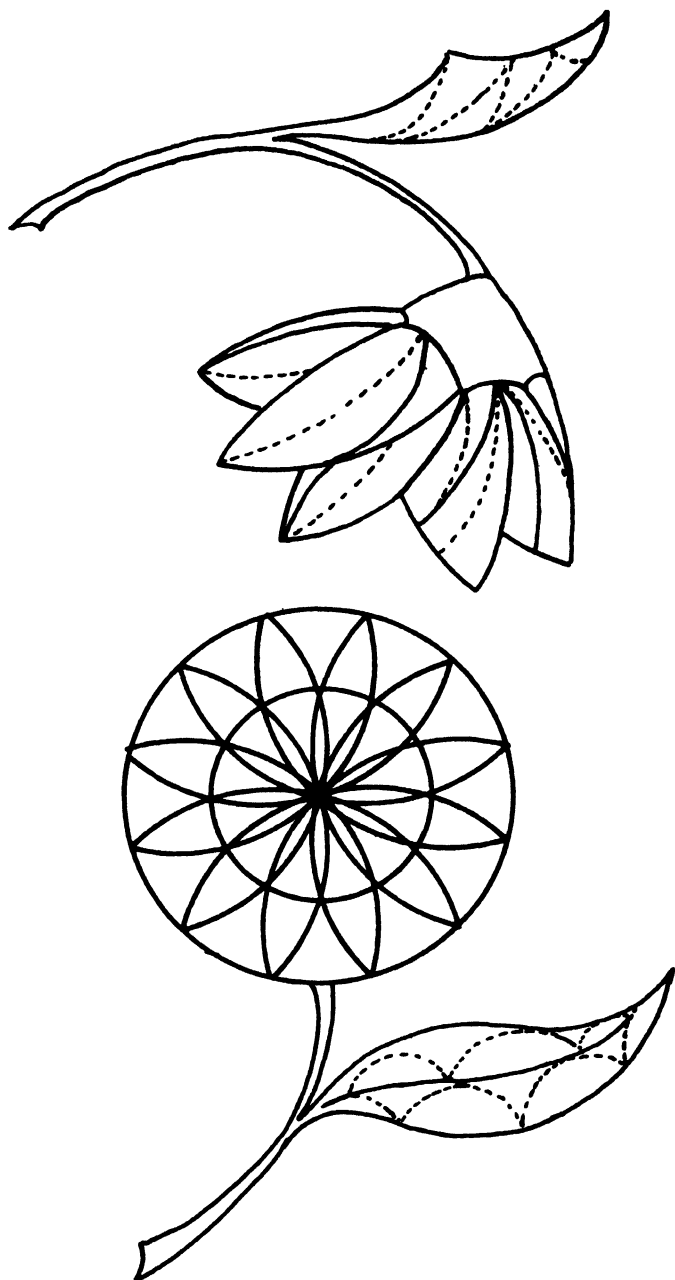
Double cuts.



Tree design conventionalised for chip carving.



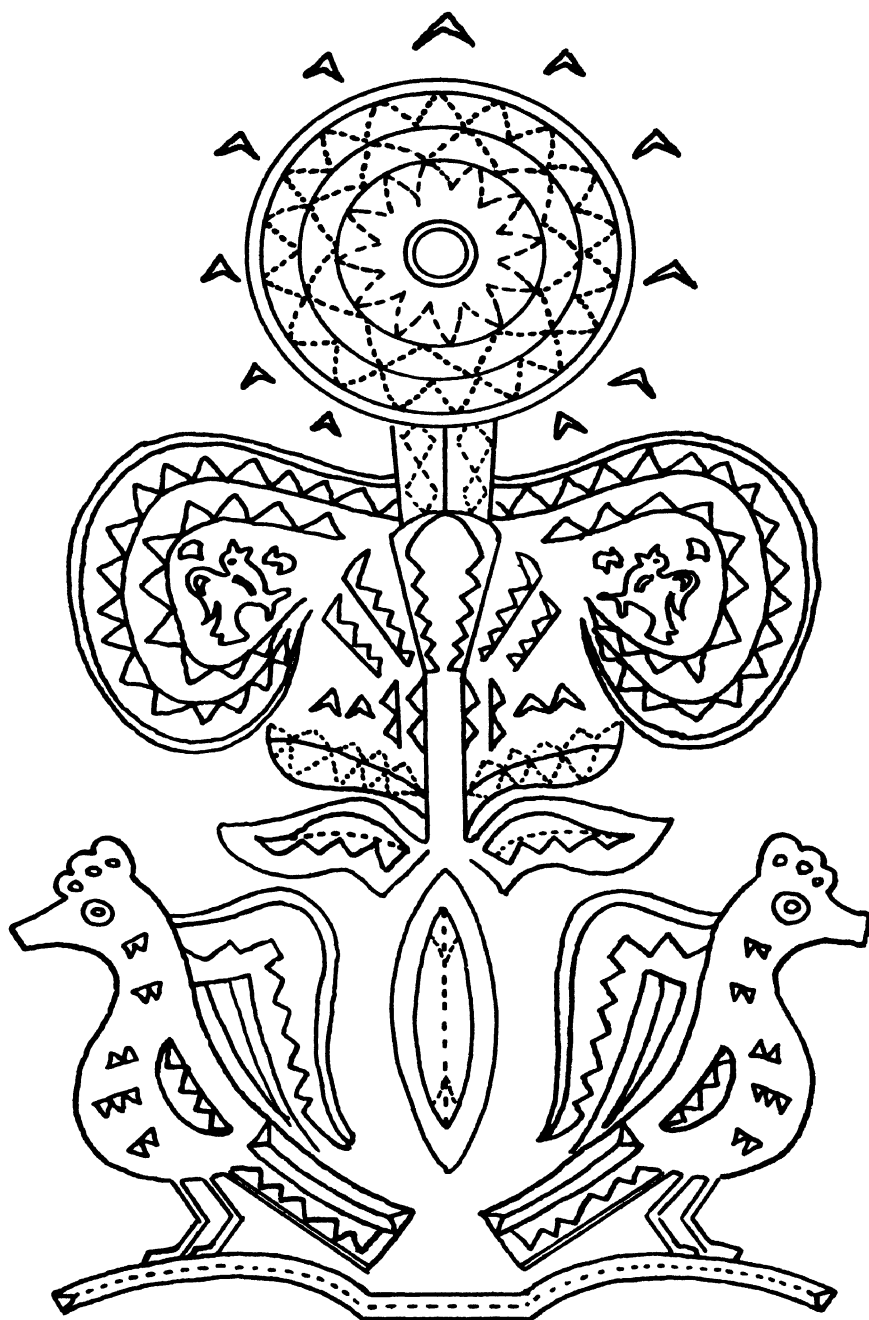
A conventionalised flower.



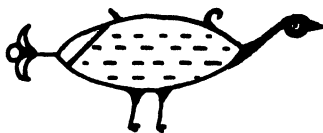
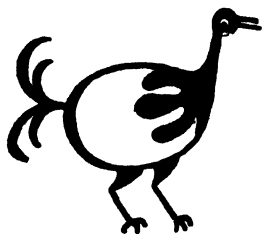
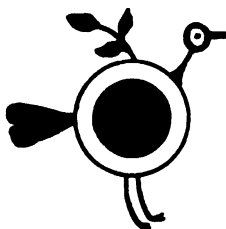
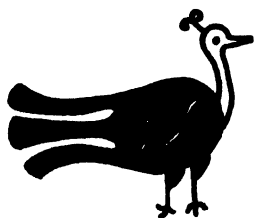
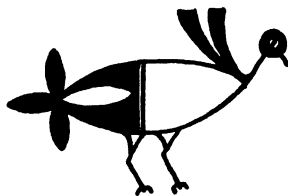
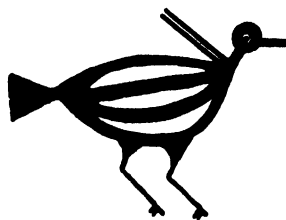
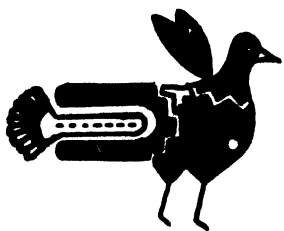
Trees and flowers stylised keep within geometric treatment, and yet suggest considerable freedom.



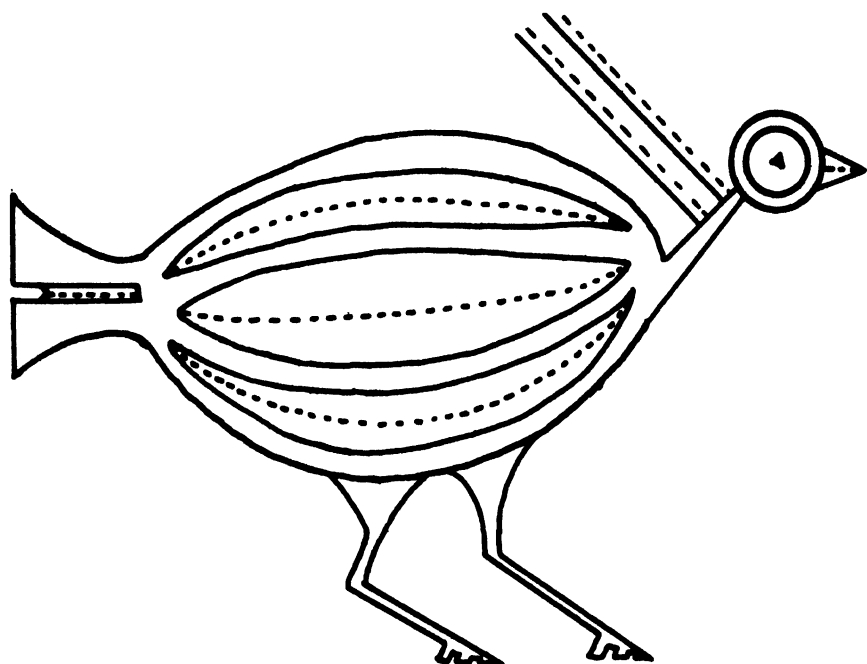
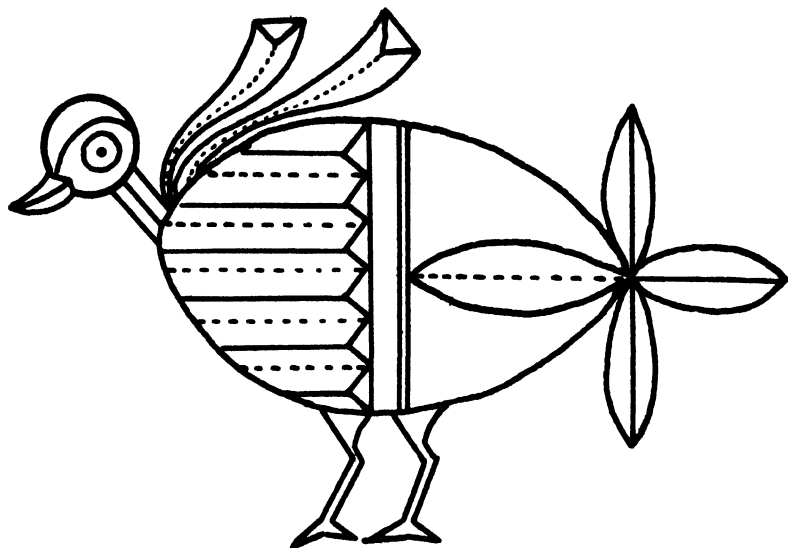
A primitive textile design from South America, at first glance ill adapted for chip carving.



The pattern shown on the opposite page laid out for chip carving.



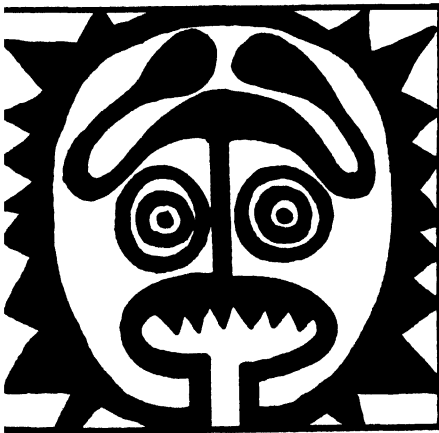
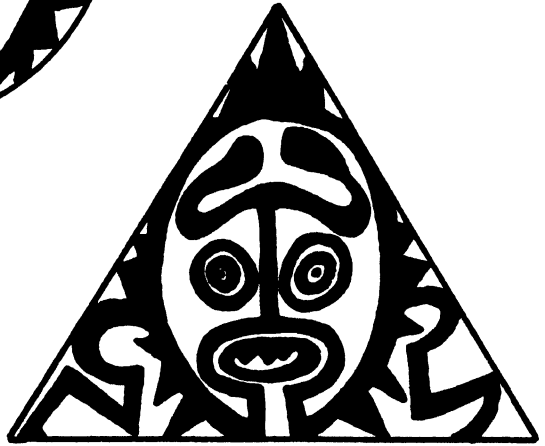
The left side of plate shows bird motifs from American Indian designs; the right side shows the same motifs adapted for carving.



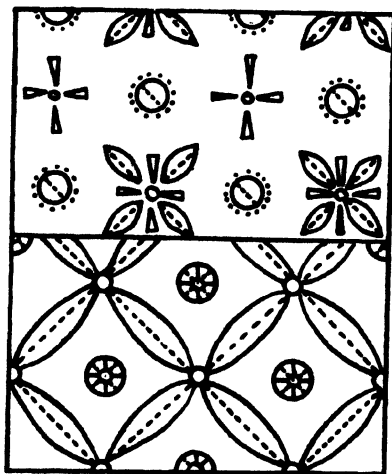
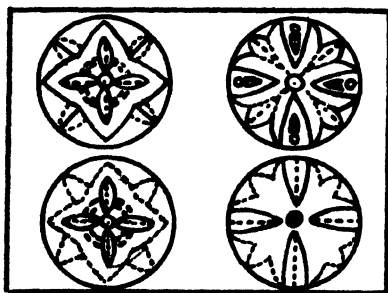
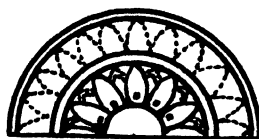
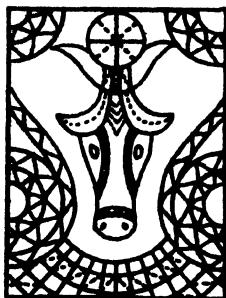
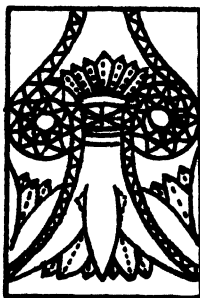
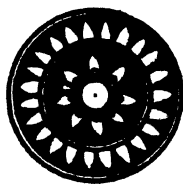
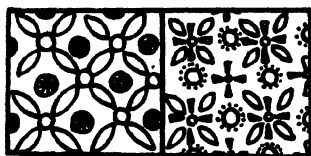
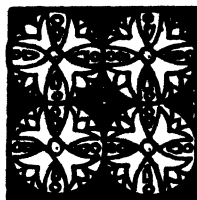
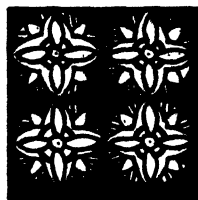
Two of the bird patterns enlarged for use as central decorative motifs.



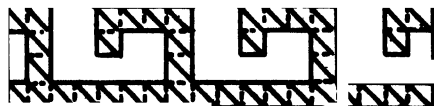
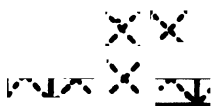
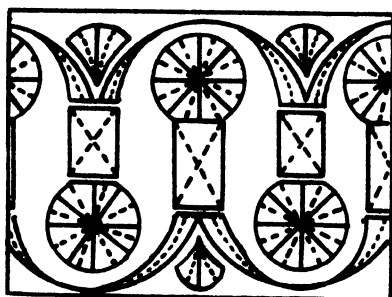
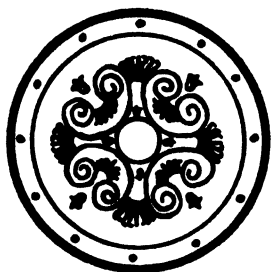
Painted wooden shield from the Papuan Gulf, New Guinea, is analysed for chip carving.



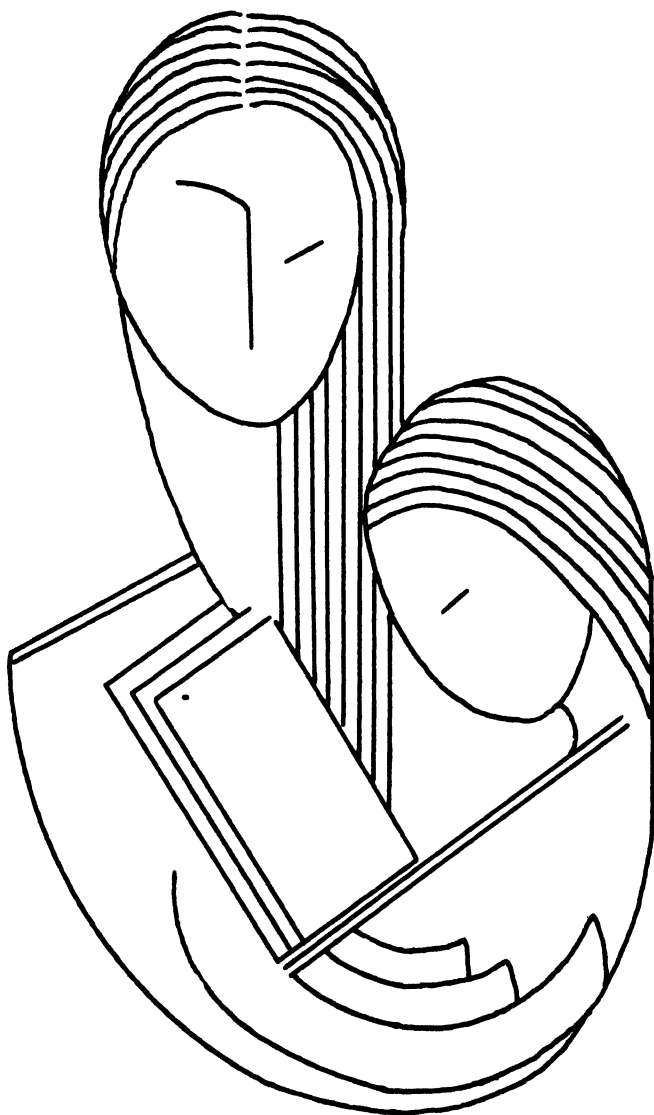
Face of shield worked out in circle, triangle, and square.



Some classic traditional patterns—Greek, Roman, and Egyptian—detailed for chip carving.



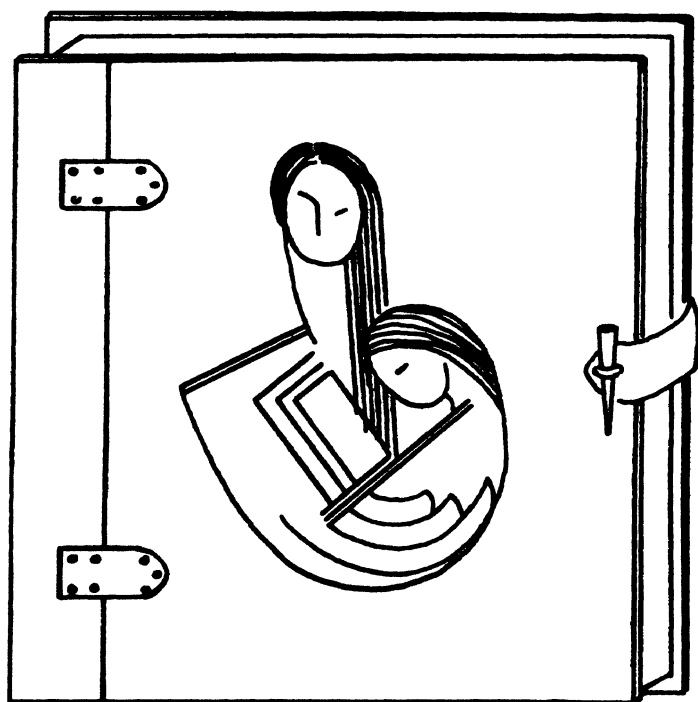
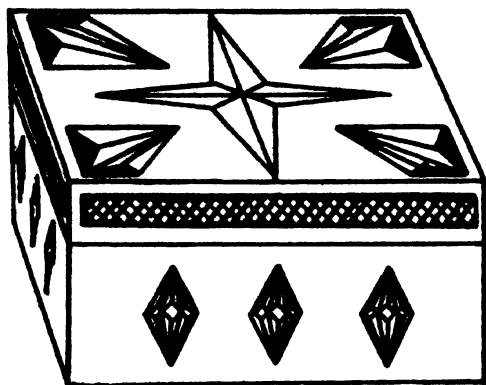
Classic border designs.



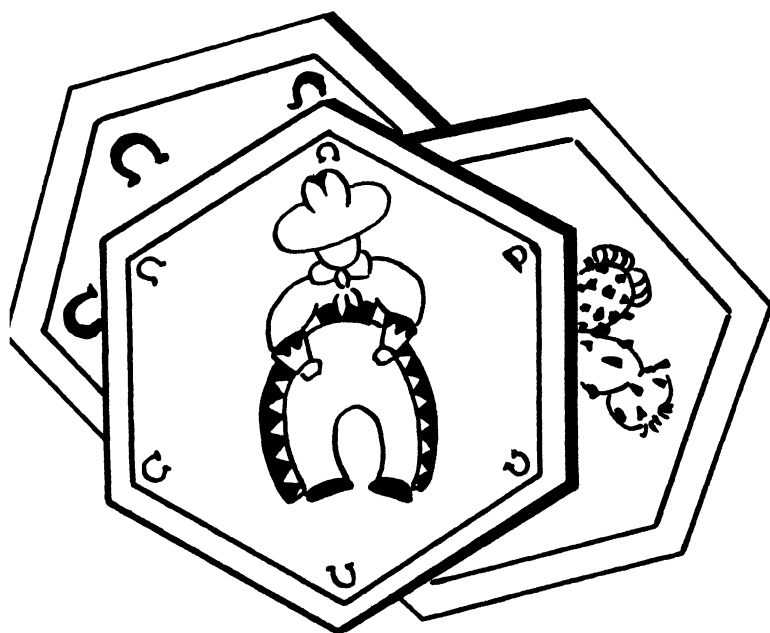
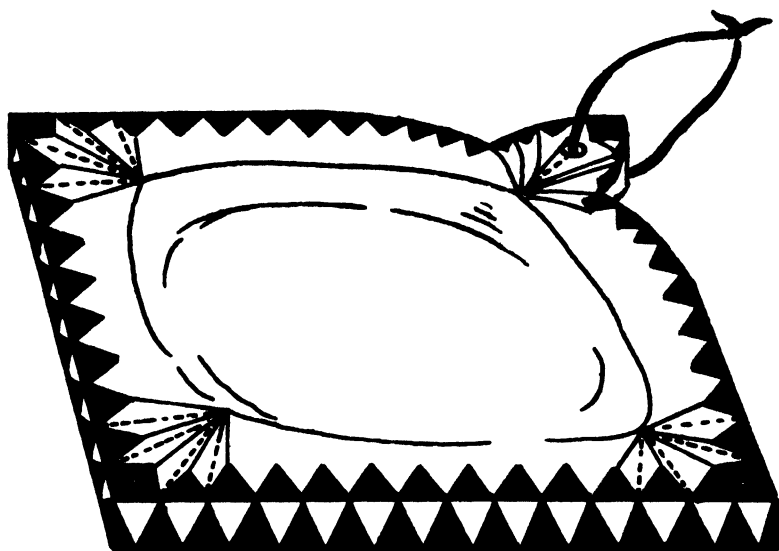
A modern madonna done entirely with lining. The procedure is to follow your pattern lines, using the slicing blade, slanting the knife first to the right, and then going back over the same ground, slanting the knife to the left. By exerting just a little pressure in both operations, a fine sliver of wood will come out, leaving a clean, definite impression.



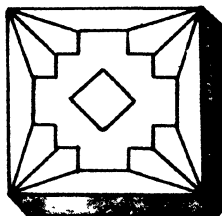
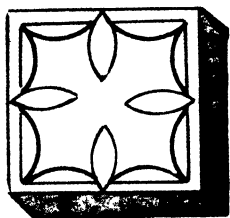
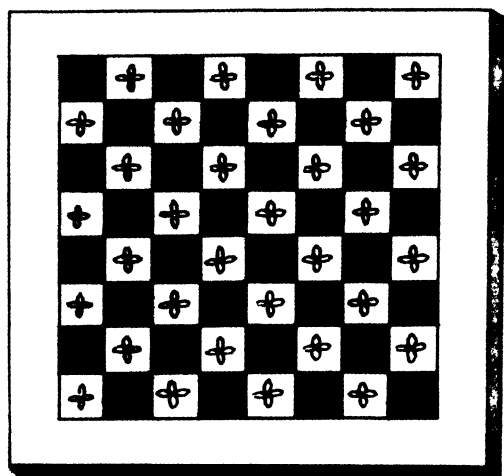
The sea horse presents a challenge for an accomplished carver. The black parts come out. The effect of the thin black lines is achieved by following the directions given with the preceding plate.



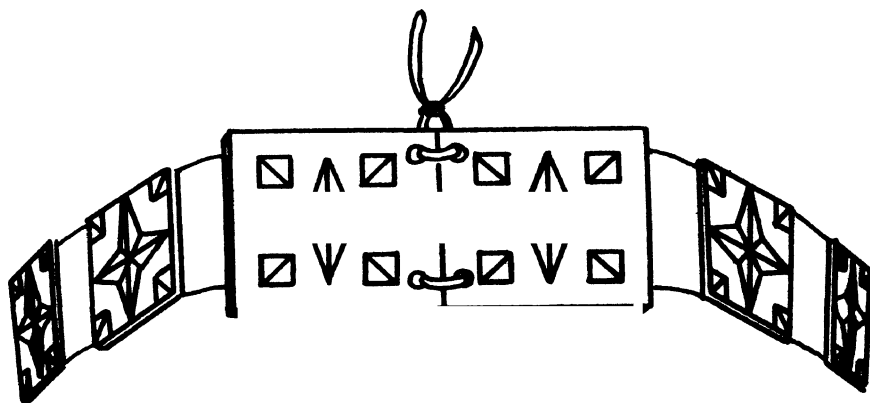
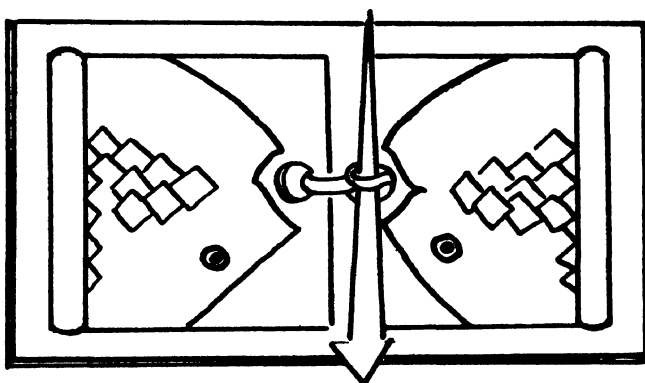
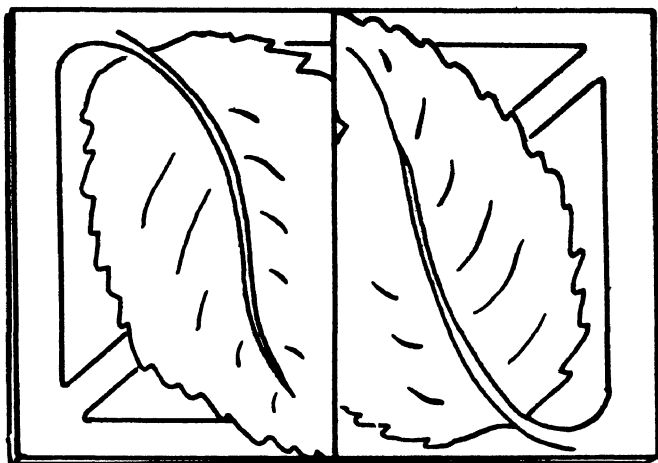
Box and album or scrap book, with leather hinges and fastener.



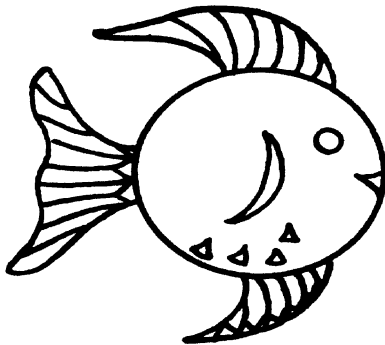
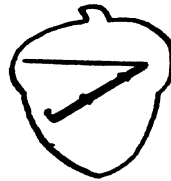
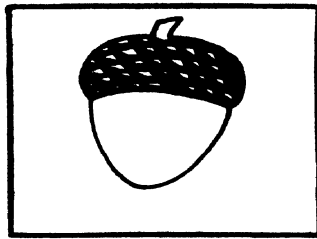
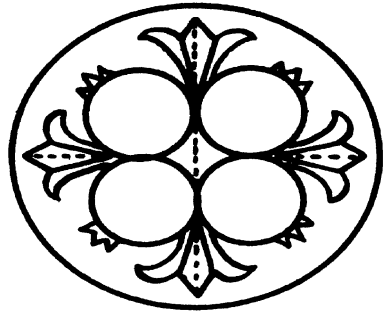
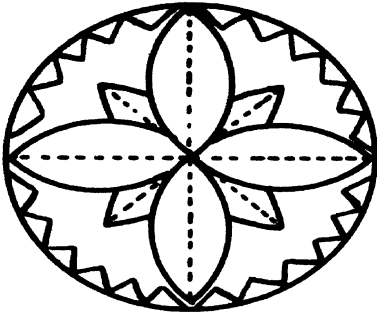
Basswood bowl of one-inch thick lumber; coasters of three-sixteenths inch wood.



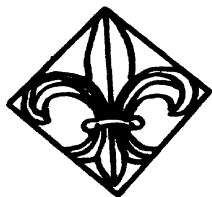
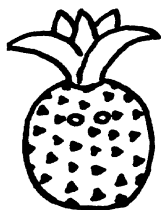
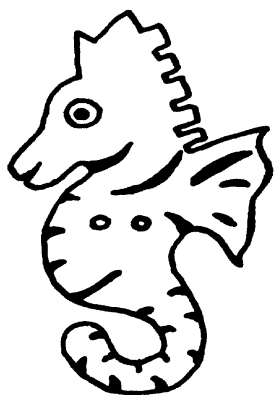
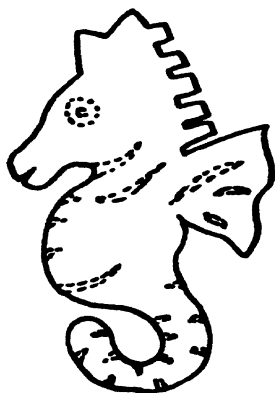
Chess and checkerboard, checkers, and chessmen. In these projects, you whittle first and carve afterwards. The board will have to be hinged or glued in the middle, for basswood comes no wider than eight inches, and that is the wood recommended for this piece of work. Three-quarter-inch lumber will be thick enough for the board and also for the checkers. For the chessmen you will need 1" x 2" blocks of basswood or sugar pine.



Belt buckles and clasps.



Costume pins for favours or gifts.



Motifs for carved buttons.

3. LEATHER WORK on a shoe string

WORKING IN LEATHER is one of the most practical of hobbies because of the useful and lovely things which even a novice can make, often within a few hours. We can only touch on it here but all the major points will be illustrated clearly enough, we hope, so that you will feel confident to go on to larger things after making one or two small articles.

In leather working, as in all crafts, the chief thing is to understand your tools and to learn how to handle them well.

It is always good practice to begin with as few tools as possible, and then add to them when you have developed some skill, and have got the feeling of the work "in your hands." Quite often, as you have doubtless noticed, very expert workmen will be found doing intricate and exacting jobs with one or two homely, unconventional tools, perhaps of their own making, whereas a beginner might feel that he had to set himself up with a dozen or more fancy gadgets although having only a sketchy notion of how to use them.

MINIMUM TOOL KIT FOR LEATHER WORK

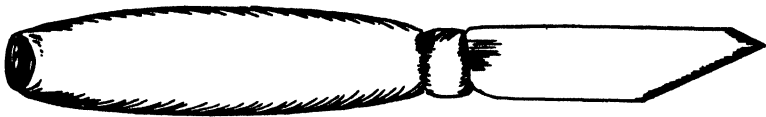
With the following tool outfit, all of which can be purchased for five dollars or less, you will be able to do almost any kind of leather work.



SPOON AND TRACER

Fig. 1

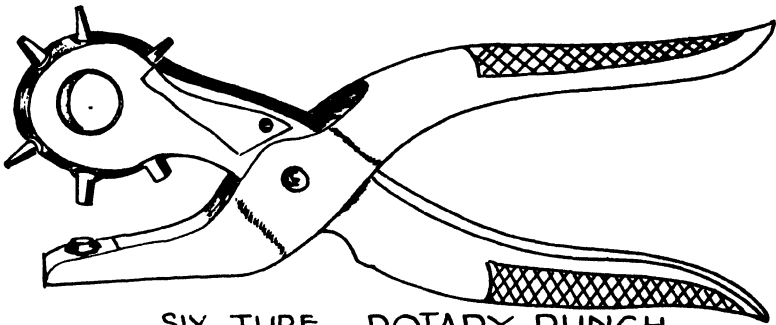
The modeller, consisting of spoon and tracer, will serve for tracing and tooling designs on your leather. The tracing end comes in handy for other things, too—drawing lines, etc.



CUTTING KNIFE

Fig. 2

This is the same type of cutting knife used for chip carving and other kinds of woodwork—a fine utility tool, and good for cutting leather. You can, however, use a scissors for cutting out, if you prefer.



SIX TUBE ROTARY PUNCH

Fig. 3

The rotary punch makes holes of several sizes—for lacing, and for putting in eyelets and snap fasteners.



WOODEN MALLET

Fig. 4

A wooden mallet is recommended for some of the operations you will find yourself doing.

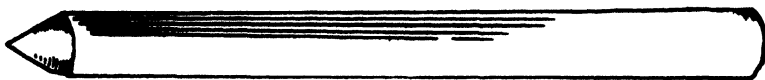


Fig. 5 EYELET SETTER

A number of useful leather articles require eyelets, so an eyelet setter is essential.



Fig. 6

SNAP BUTTON FASTENER

This is for setting snap-fasteners and it is indispensable. There is a six-inch steel rule, as you see. It is for measuring and marking off the leather.

In addition to these things, you will have to have a working surface. A hardwood board in a size large enough for cutting out handbags, book covers, or portfolios, makes a good portable work table. Keep one side smooth for tooling, and on the other do your cutting and pounding. (If there is a glass slab around, you can use that for a tooling surface.)

MATERIAL AND SOURCES

The kind of leather you use will depend, of course, upon the kind of article you are going to make. Calf skin, cow hide, steer hide, goat skin, morocco—these are some of the most important kinds. If you are going to do tooling, specify this when buying your material. Some kinds of leather are too heavy or not properly processed for this purpose; you will be on the safe side if you buy English kip, calf skin, cow hide, and goat skin.

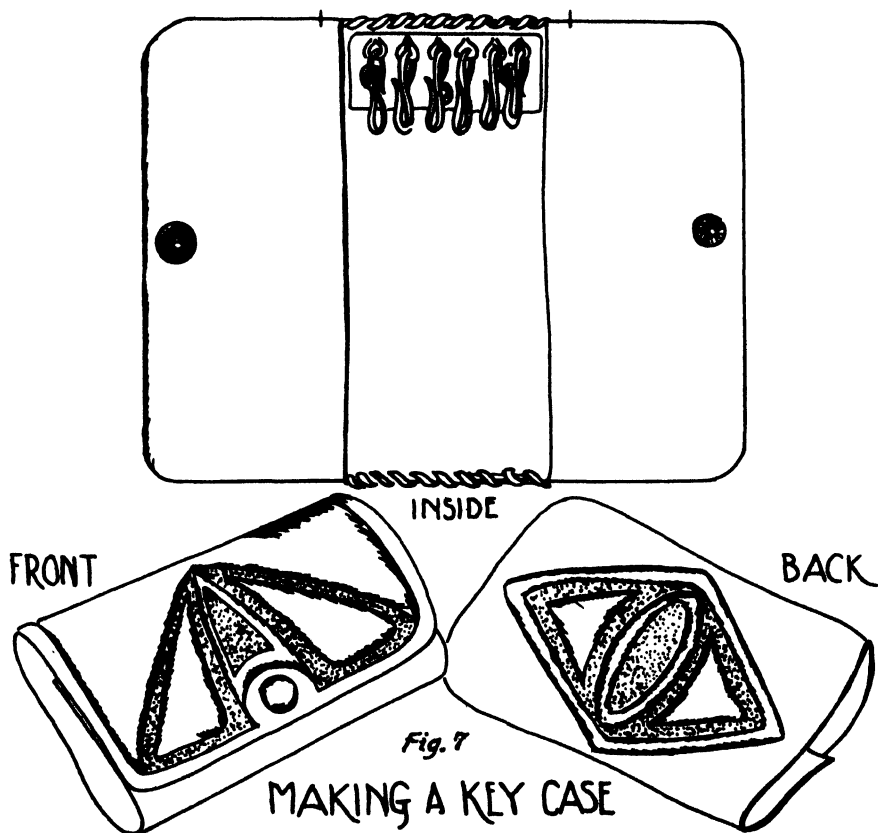
Leather is sold in whole, half, or quarter skins, and in remnants, and it is priced by the square foot. Kid skin and soft leathers and a shaved leather known as "sciver" are often used for lining. For lacing the best thing to use is goat skin. It comes in many colours, to match the dyed leathers. There is a composition lacing, slightly cheaper, but use goat skin if you can get it, for it is more durable and better looking.

Handicraft supply stores usually sell leather, and in most large cities there is a leather district where you can buy wholesale or retail. Many of the small shops in these quarters do a tremendous business by mail.

MAKING A KEY CASE

We have chosen a key case because it involves almost all the operations used in leather work. After you have made one of these, you will be able to forge ahead into advanced work.

The first thing to do is to cut a paper pattern. The size is a matter of your own taste and convenience. There are two points especially, to be noted. (Fig. 7.) The marks on both sides of the key plate indicate that you must allow some material here for the fold-over—one-quarter inch on each side. Also allow for the overlapping of the ends. Rounded corners and a scalloped edge for the overlap make a nice finish.



Lay your paper pattern on the leather. You can use a little rubber cement on the corners to hold it in place. Learn to be economical in laying on your pattern. Leather scraps can be utilised for buttons, book markers, and small purses, but don't cut into your material until you have figured how to get the most out of it.

Put your ruler on the edge of the pattern and draw an outline with a pencil or with your tracer. Cut it out with a knife or a pair of scissors. If you use a knife, hold the steel rule firmly at the outline while you cut; this will guide and steady your knife and give you a clean edge.

Next cut an extra piece of leather on which to mount your key-plate (Key-plates, by the way, can be purchased at craft stores. They hold from three to six keys.) The leather mount should be about three-quarters of an inch wider and an inch and a half longer than the plate. If you like, you can make it long enough to be laced in at the bottom. This will make the case a little firmer.

Draw a design on paper and transfer it to the right side of the leather for tooling. If you haven't an idea at the moment, perhaps you can find a decoration that appeals to you somewhere else in this book. But don't make an exact copy of anything. You'll enjoy your work more if you put some imagination into it.

Wet the leather all over on both sides with a sponge. The design draft will adhere to the damp hide while you are tracing it. Use the tracer end of the modeller, and impress the design firmly into the leather. (If it dries while you are working, wet it again, and go all over it, front and back, each time.)

The first step in the actual tooling is to deepen your outlines with the tracer. Next, with the spoon held sidewise, follow the outline—the edge of the tool should rest in the dent. Press down and away from the outline towards the centre of the background. Go around the whole outline this way, to throw the design into sharp relief and then go over the background area with the spoon. When making your outline deeper with the tracer use a sort of push-and-pull stroke. This keeps it even and prevents it from looking gouged in places. If you are stippling part of the design, use the tracer end. For any place where the design is to be impressed deeply, and where there is a large area, use the spoon.

Before attaching the key-plate to the extra piece of leather, make holes along the top edge with the rotary punch (the small hole) where it will be laced into the case proper. Place the key-plate on the mount and make a pencil mark where the eyelets must go. Then punch the holes. Push the

metal eyelets through from the plate to the back of the mount. Then turn it over, use your eyelet setter, and flatten it out by giving the end of the setter a blow with the mallet.

Mark the place where the snap fastener is to go, punch the holes, and put in the button part first. The fasteners come in four parts. The hollow metal piece which fits over the snapper is put over the larger end of the snap-setting device, after pushing it as far as it will go through the hole in the leather and into the button. Cover the button or the end of the mallet with a piece of leather or cloth to avoid scaring the button. Give one smart blow with the mallet to set the button. The button usually goes on the right hand side of the case.

Fold over the lap and make sure that you have marked the right spot for the other part of the fastener. You will see how it has to go, and also that the smaller end of the setting device is made to accommodate this part of the fastener. Use the little steel gadget that comes with the ruler. Place it over the snap projection, and give a blow with the mallet. A second blow here is liable to flatten out the fastener, so try to gauge your stroke nicely.

Your key case is now all finished but the lacing.

STITCHING OR LACING

You must first punch holes along the edges to be laced. If you are going to lace together two pieces of leather of equal thickness, you must "scive" them down enough towards the edge so that when glued together they will be no more than one thickness. Trim the edges if they need it. They must not be ragged.

Cement the leather mount to the outside of the key case before beginning to lace. To make sure that the holes will match, make a pencil mark for them, and work from that point in punching the rest of the holes.

Use your steel rule and a pencil or the tracer to draw a line for your holes. The depth of the lacing depends on the article—the size and the wear and tear it may have. One-eighth or three-sixteenths of an inch from the edge will be about right for fine work. The holes should be one-eighth of an inch apart.

A tool which is helpful here, but not absolutely necessary, is a three- or four-pronged marker, or a tracing wheel. Either of these will make marks to guide the rotary punch so that your holes will be evenly spaced.

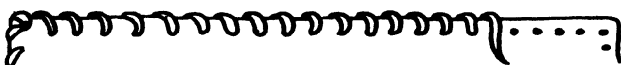
STITCHING OR LACING




NO.1 SINGLE-STRAND RUNNING STITCH



NO.2 TWO - STRAND RUNNING STITCH



NO.3 ONE-STRAND SPIRAL OR WHIP STITCH



NO.4 ONE-STRAND ALTERNATE SPIRAL




NO.5 VENETIAN SPIRAL OR WHIP



NO.6 ONE-STRAND BACK STITCH



NO.7 TWO-STRAND BRAIDED SPIRAL



NO.8 CROSS STITCH



NO.9 LOOP STITCH



NO 10 SADDLE STITCH

Fig. 8

(If you want to invest in an additional tool, there is a gauge punch which is very useful. It marks the place for the next hole, as it punches.)

Figure 8 shows ten ways of lacing leather. There are still more lacing stitches, but these are the most important. The most commonly used are the Single Strand Running Stitch (No. 1), the One-Strand Spiral or Whip Stitch (No. 2), the Loop Stitch (No. 9) and the Saddle Stitch (No. 10.) If you do much leather work you will eventually need to know all ten.

The amount of lacing needed varies with the different stitchings, the depth of your border, and the thickness of the leather. For the Single Running Stitch allow about one and three-quarters times the border measurement; for Spirals about two and a half times.

The Saddle Stitch takes two and a half times your measurement. You can use waxed linen thread for this type of stitching, and you will need two upholstery or leather working needles.

For the other types of lacing you must allow five or six times the border length.

The Florentine lacing (No. 5) calls for a soft, pliable lacing about three-quarters of an inch wide. For all other lacings use the goat skin.

In doing lacing, keep the inside of the work towards you and work from left to right. For a small article have your lacing in one piece. If you make large things, however, you will have to divide your lacing and splice it. You do this by sciving the ends to be joined (about three-quarters of an inch) and pasting them together with rubber cement.

A BRAIDED LEATHER BELT

These belts can be bought from craft supply stores cut out, and ready to be laced. (Fig. 9.) Order them whatever width you want; the proper length is your waist measure plus ten inches. If you want to do the whole thing yourself, follow Figure 9 and cut the strands one-quarter inch wide. They are made of cow hide.

The illustration shows the beginning of a ten-strand belt, and it is the kind called "single-strand" because, as you see, you work with one strand at a time.

Begin with the outside strand on the right. Braid it to the left over the second strand, under the third, over the fourth, etc. At the other side it will go over the tenth strand. Next take the second strand. Braid it also to the left, over three, under four, etc. When you reach the left side with strand two, take the first strand, and bring it under the second, in

line with the other strands. Continue in the same way, braiding the outside strand at the right through all the strands to the left, and at the left always bring the preceding strand under it. The strands should be only slightly slanted and they must be kept parallel or the belt will not be straight.

For a double strand braid, proceed exactly as above with regard to measurements and setting up, and then instead of taking strand number one at right to start, take the first and second together, and carry them over three and four and under five and six to the left, etc.

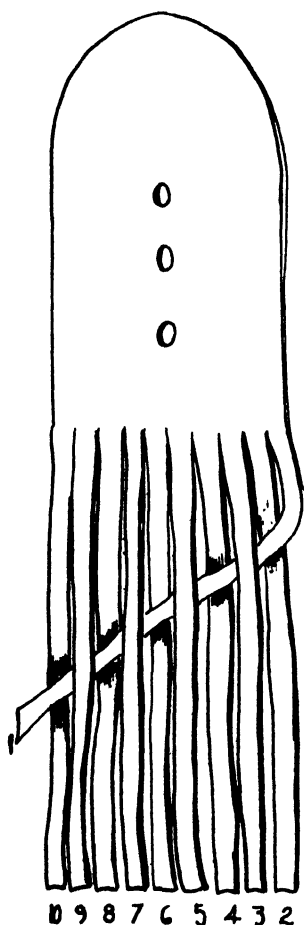


Fig. 9

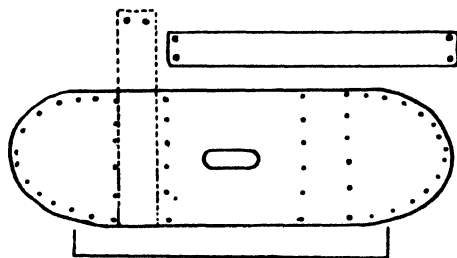


Fig. 10

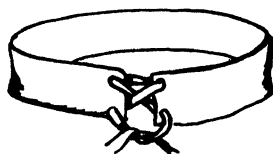


Fig. 11

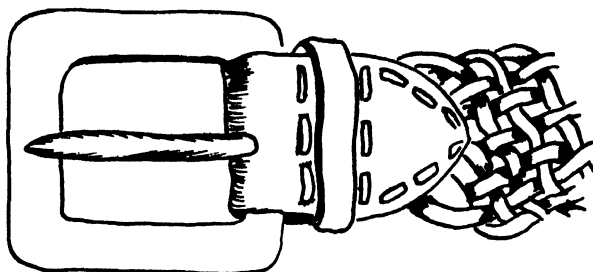


Fig. 12

Figure 10 shows one piece of scrap leather shaped and punched with holes ready to slip through a buckle to finish the belt; and the small piece of leather is the "keeper." The hole in the centre of the large piece is for the pin of the buckle. Punch holes in one end of the tab and then double it and mark the places for those at the other end, for they must correspond exactly.

Trim off the strands and glue them as flat as possible under one side of the tab. Insert buckle. The keeper should go loosely around the tab and the ends should just meet. Punch holes in the ends, as shown in the illustration and tie them together. (Fig. 11.) Put it in position around the top half of the tab between the two rows of holes. Fasten the two halves of the tab together by lacing through these two rows of holes. Then lace the oval ends of the tab together. It should look like Figure 12 when you have finished.

4. SKETCHING from scratch

By Eugene C. Fitch

YOU HAVE A PENCIL in your hand and you're doing things to the back of the envelope that came in on your breakfast tray. The little old ladies in "Mr. Deeds Goes To Town" called it "doodling," and it may not look like much, even to you, but given pencil and paper most of us can't help mixing the two. Look closely—perhaps, among the circles and squiggles there's a daisy or a profile. You're sketching—something you've remembered or can see! Maybe you'd like to be able to draw the flowers Aunt Minnie sent, or the awe-inspiring little person who takes your temperature. Then you remember the struggle you had in school, trying to understand perspective and balance and proportion, and you turn on the radio or find your place in the thriller you didn't quite finish last night.

Or maybe you don't. Maybe you call for a lot of paper and a handful of pencils. This is one time when quantity, not quality, counts. Get a good thick pad of the cheapest paper, size 8 by 10 or 10 by 14, and a big, empty waste-paper basket. Get several medium soft lead pencils, well sharpened, and don't bother about erasers unless you just like to chew on them.

To make the shift from unconscious doodling to conscious sketching, you will have to cultivate the "seeing eye" and the habit of observation.

You'll learn to look at anything and everything, no matter how familiar, as though you were seeing it for the first time. The differences in colour, texture, and form waiting to be discovered will amaze you. Just, for instance, let your eye follow the moulding that runs around your room. See how the light and shadow play on it, making some areas hard and sharp and others soft and almost lost in the wall.

Even the faces of your friends and relatives hold surprises. Have you ever considered the differences in contour of the left from the right side of a face? I saw a trick photograph the other day where two left sides had been photographed to make a "new face" and the two rights to make a third. The results showed three completely individual faces which seemed to express three wholly different characters.

If there's a plant in your room, look at its leaves. They all have strong similarities because they all belong to the same family, but no two will be exactly the same.

Your eye is like the lens of a camera. If it is trained to see, it will give you a distinct image, but it must be focussed. When your mind receives true images, it can select from among them and convert its impressions into artistic expression.

The images you select and create will eventually influence your style.

Remember, your "trained eye" will be your most valuable asset, the source of your inspiration, and your final judge.

Suppose we start with the glass on the table next your bed. It's an ordinary water tumbler and you've held it in your hands—or one just like it—hundreds of times. Now look at it, hard. You don't want to make your picture of it an exact facsimile. In that case, you'd better turn to the next chapter and use a camera. You want to draw it so that anyone looking at it will recognise it, but you also want it to be your idea of this particular tumbler.

Is it twice as tall as it is wide or only half as tall again? Settle this problem of proportion in your mind. What kind of line expresses "glass" to you—thin and hard, or soft and fuzzy? Get that decided.

Draw the lines that will make the two sides. Do they slope or are they straight? Now look at the top and the bottom. You find two circles, don't you? But they are full circles only when you are looking straight down on the glass from above. You see it differently if it is above or below your eye level. (Fig. 1.)

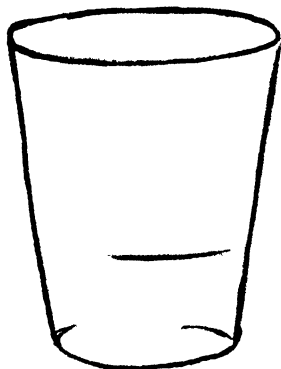


Fig. 1

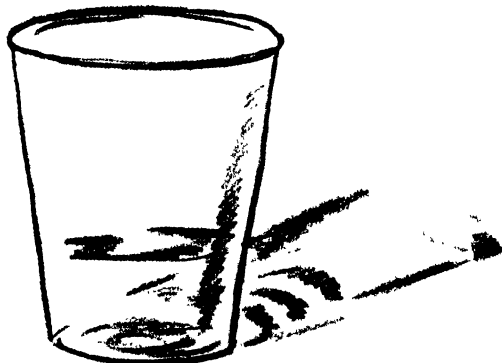


Fig. 2

Now that you have your outline, consider what is happening to the glass at this moment to make it interesting. Does the light from the window throw one side into shadow and put a cast shadow on the table beside it? (Fig. 2.)



Look at the cast shadow. It is a distorted replica of the glass and can be used to emphasise the shape. The shadow will vary with the time of day and the season of the year if you are working outdoors. When the sun is directly overhead at noon there are practically no shadows, or only very short, dark ones. Most painters prefer to work in the early morning or late afternoon when the shadows are lighter and longer. Indoors, the shadows will depend upon windows or electricity for their source. Draw the shadow cast by your glass.

All right—how does your drawing look to you? Try it again, drawing more quickly and purposefully.

Would you like to try a still life or composition? We'll forego the pansies and the vinegar cruets this time, and settle for the things you are likely to have on your table. Let's assume that you have a growing plant, a handkerchief, a book, and a pack of cigarettes. Arrange them as you please, but

open the book so that it will be more interesting to sketch, and drop the handkerchief (opened) on the foreground.

Consider each article in relation to the others. Think of size, shape, texture, and colour. Take five minutes and look. You are going to have to cope with objects spreading away from you toward the back and to the sides.

Just as there is no sound without an ear to hear it, there is nothing big or little unless there is something else to which it may be compared. Make your comparisons of size. (Fig. 3.)

Start with the largest mass, probably the open book, and lightly sketch it in, being careful of proportion. Put in the articles that overlap it or lie nearest to it. Work outward. After your first lay-in, check up for relationships. Don't erase—just pencil over the old lines.

Look for what is called "movement." The book is comparatively quiet; it lies flat on the table. The pack of cigarettes is lying across the open book at an angle, and sets up some movement there. The potted plant reaches upward and the handkerchief lies limply on the table. When we talk of movement in a picture we don't mean racing horses or dashing waves, but rather the cross-currents of lines. In painting, the use of colour adds to movement, but in sketching we must rely on line and shadow.

Now that your objects are placed on the sheet, study each one for its characteristic qualities. Focus first on the book. Is it old or new? Has it been much or lightly used? The book in the illustration is old. A soft, broken line at the edges of the cover, bent corners, pages out of line, the book lying flat because the binding cords have loosened—all these are clues to the personality of this particular book. The lines, then, are not hard and slick, but soft and blurred and warm.

The cigarette package is different. Someone may have just brought it in, and it's practically full—it hasn't been rumpled or sat upon. It's shiny and its corners are squared, so the lines for it should have the clarity of those you used in drawing the water glass.

The handkerchief has still another quality. It is the lightest object in the collection and it is soft. Fine but soft lines express the tactile or touch quality best. It is broken into facets, but don't try to get them all in your drawing. Again, this isn't a photograph. Indicate only the big shapes. Get the big line movements first.

In the flower pot you have weight, solidity and a quality of the earth. This calls for the heaviest lines in the entire sketch. To get a feeling of roughness, use a cross-hatched line or anything that gives you a feeling of clay. Watch your circles and do not end them at the point where the

ends meet, but carry them up and around—a circle is endless. The earth in the pot is soft, moist and dark, and crumbly on the surface. This can be expressed with dots, or if you prefer, with short lines. The illustrated plant is smooth, sturdy, very thick at the base, dividing into thinner and thinner branches. Try to feel the new branches growing from the old. It's a continuous upward growth—newcomers are not tacked on.

We've talked so much of lines and how they can express texture and movement that we'd better stop for a while and remember that things are not just space enclosed by lines but real substances with three dimensions: height, width, and thickness. They break the stream of light and light works on them. In the first place, light makes them visible. It highlights the side nearest to itself and throws the far side into shadow and eventually casts a second shadow beyond the object itself. All shadow will enrich your drawing with solidity, colour, and depth.

Look at the next illustration. (Fig. 4.)

Notice how much more real the object appears. Its purpose is to present

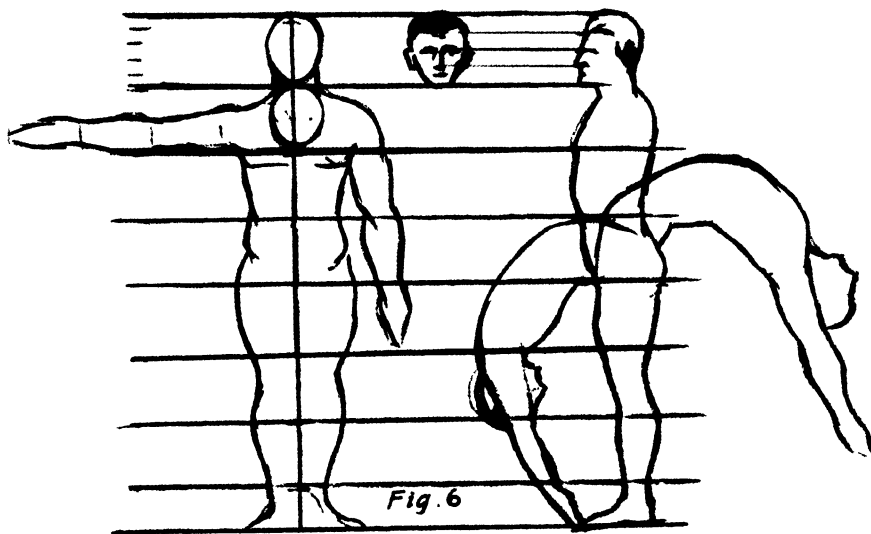




Fig. 5

objects as realistically as possible and still stay within the realm of artistic representation. It is not a photograph—it is still a selection made in the artist's mind.

To make it into a decorative drawing would mean forcing the form and shadow into a chosen pattern with less regard to what the physical eye sees and a great emphasis on design. (Fig. 5.)



Proportions of the Human Figure.

DRAWING FIGURES

You probably remember hearing your art teacher say that the ideal figure, the classic Greek, measured eight heads, but do you remember just how said heads were distributed through the torso and legs? Just as a refresher, Figure 6 will set you straight, and since most of us humans go around with figures slightly less than ideal, it is divided into seven and a half heads, which is more usual to us modern *homines sapientes*.

The simplest way to draw the figure is by action lines or sticks. Draw one for practice, keeping the arms, legs, etc., in proportion, according to Figure 6.

When you want to animate your figures, you'd better find some agreeable friend to act as a model. Set him problems such as bending down to tie a shoe-lace, reaching the top shelf in the closet, carrying a loaded tray. The first thing you'll probably notice is that whenever one set of muscles is stretched, another complementary set is contracted. If your model is touching his toes with his fingers, the muscles in his back will be stretched, and the ones in his abdomen will be pulled in and shortened. When the muscle in the upper arm, the biceps, is contracted, the muscle at the back of the arm, the triceps, is stretched. (Fig. 7.)

If you can't find a model, look at photographs in magazines and imagine the characters stripped to stick construction and draw them, keeping their lines of action.

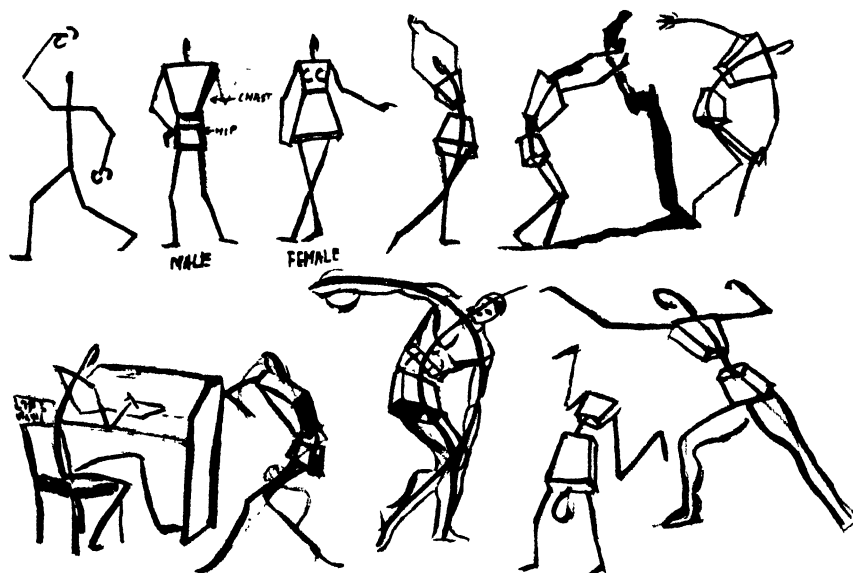


Fig. 7

ANIMATED FIGURES

The stick drawings, of course, are only the first step. (Fig. 7.) The next might be building them up with eggs. It sounds mad at first, but almost every part of the body can fit into an egg. In the following illustrations (Fig. 8) you can see how it works and how the male and female forms differ in their construction and proportion according to their functions.

After these two rather mechanical exercises, cut loose and draw the figure as you see it.

When you come to a group of two or more figures, you're going to meet problems of rhythm, movement, and proportion. You're also going to have a try at portraying drama or mood. (Fig. 9.) If your people are in harmony, you will probably place them rather close together, and the movement and rhythm will draw them into a unit.

When the figures are opposing each other in argument or combat, fear or hate, the rhythm should be sharp and the lines of the figures in juxtaposition.

Just for fun—check the basic ways to draw feet in Figures 10 and 11.

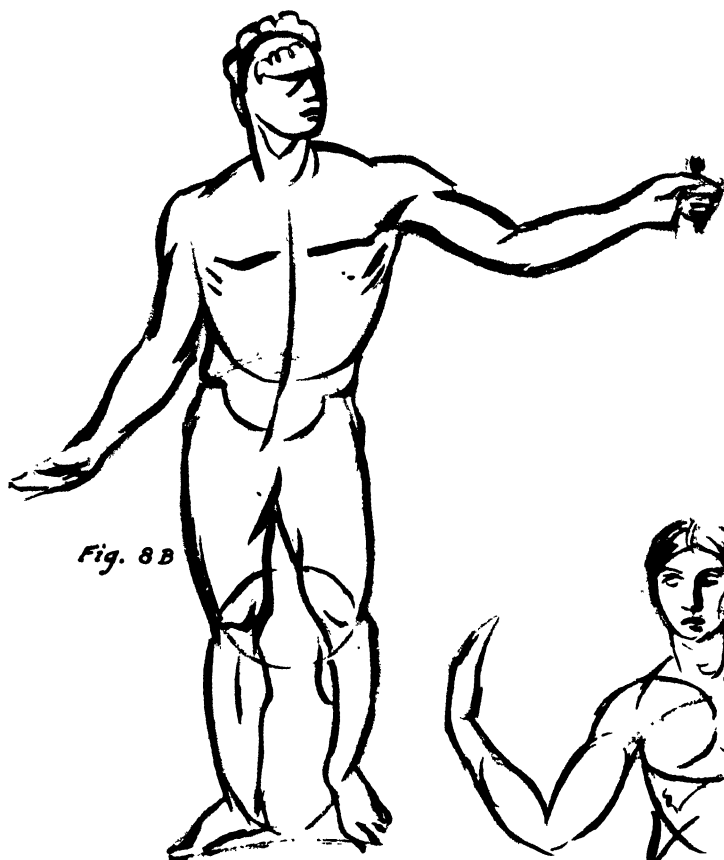


Fig. 8B

Every figure will fit
into an arrangement of
ovals.



Fig. 8A

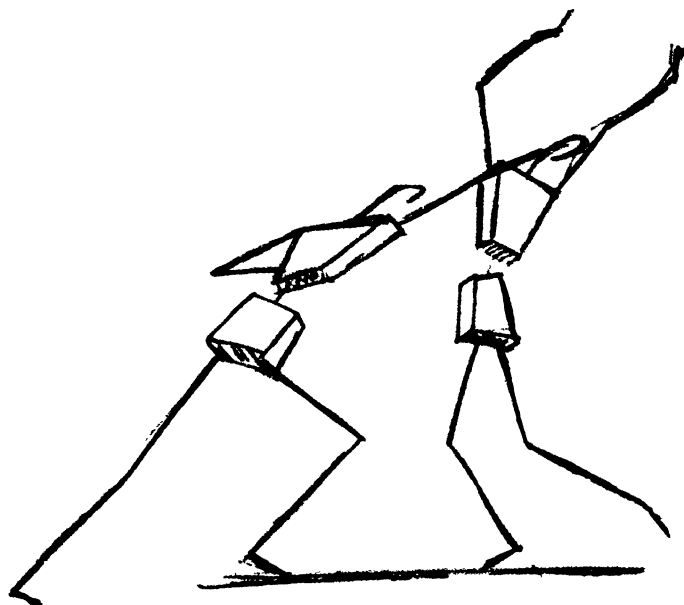


Fig. 9

LINES AND ILLUSIONS

- A. Perpendicular lines suggest growth or reaching.
Broken perpendicular lines suggest action, conflict.
Horizontal lines are quiet, peaceful.
- B. If the large glass is covered, the bottle seems to grow in proportion to the small glass left exposed. Bottle will appear to decrease in size when the small glass is removed and it is compared to the larger glass.
- C. Can you tell which is the taller figure? Actually, both figures are of the same height. Illusion is due to false perspective.
- D. Are the two horizontal lines parallel?
- E. Are the oblique lines parallel? (Fig. 12.)

TO RETURN TO DOODLING

Don't give up your doodling. Look at it imaginatively and you'll probably find hidden compositions lurking in them. Here are some that your illustrator pulled out of his hat.

If you've had a good time following these suggestions, and if you want some first rate technical help, get some of the following books from your local library.

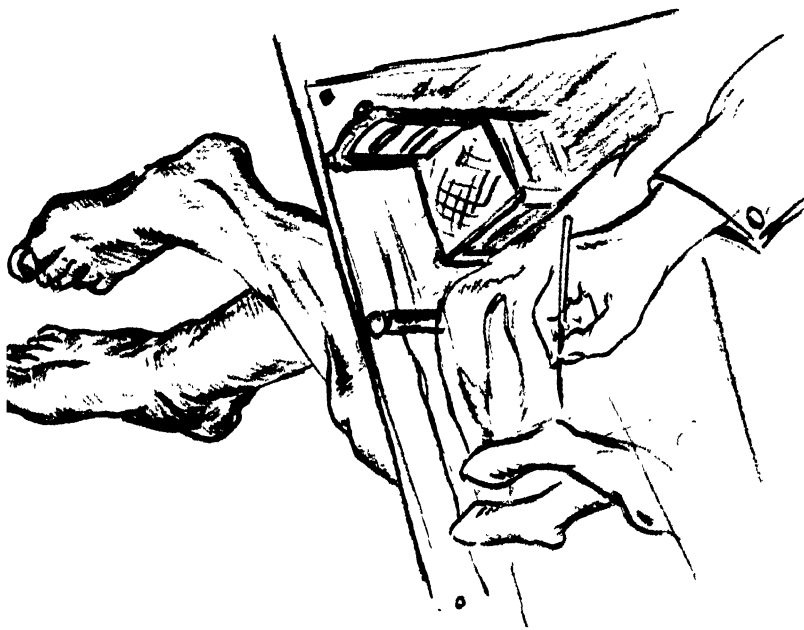
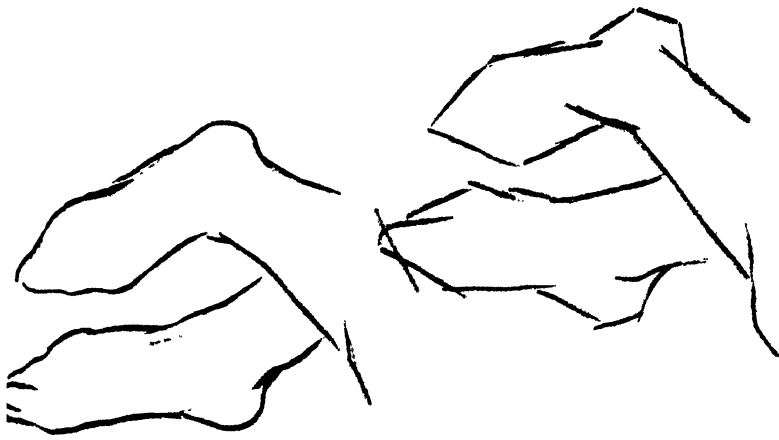


Fig.10

PRACTISE SKETCHING YOUR OWN FEET



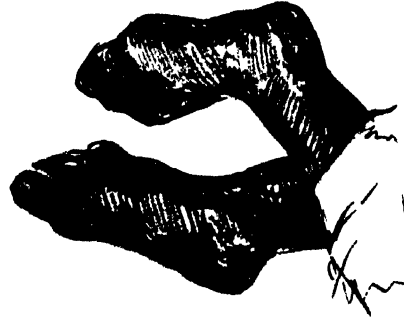
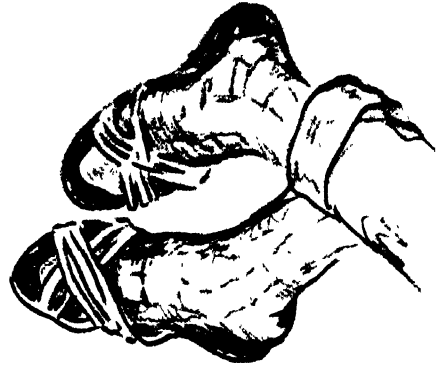
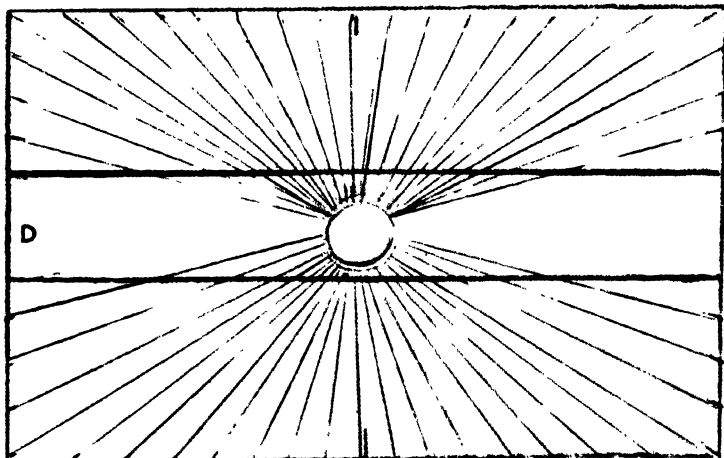
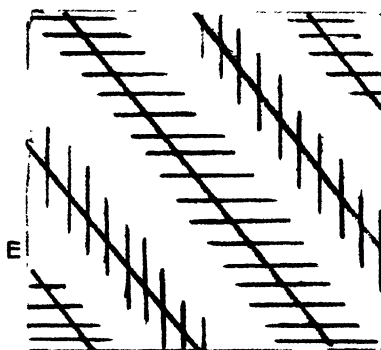
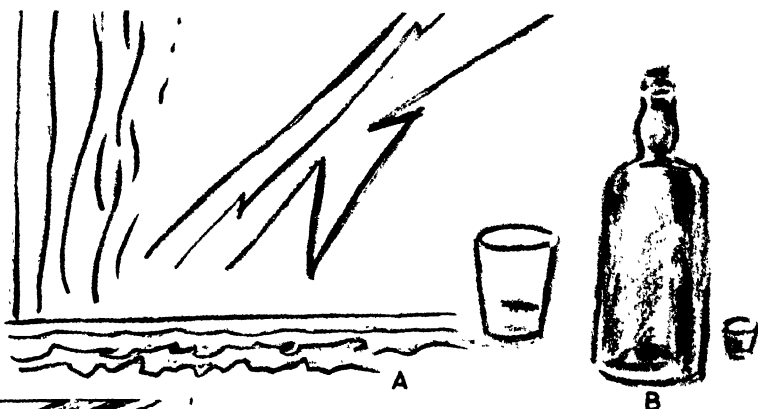


Fig. 11

CUSTOMING YOUR OWN FEET WILL BE A GOOD



PROPORTIONS
Forced Perspective—Illusion in Line.



Spiral Comp



Light in Center



Exercises in composition. Try some of them yourself. You will find out a lot about mass, form, and perspective, by playing around like this, in small compass.

SURPRISE



LANDSCAPE



THE ARAB



STEAMING AWAY

Doodles.



SKY BATTLE



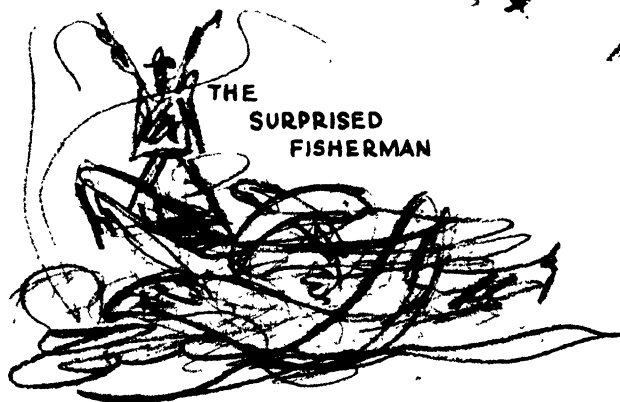
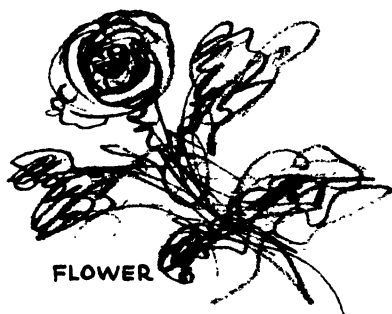
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THE DIVER



ESCAPE



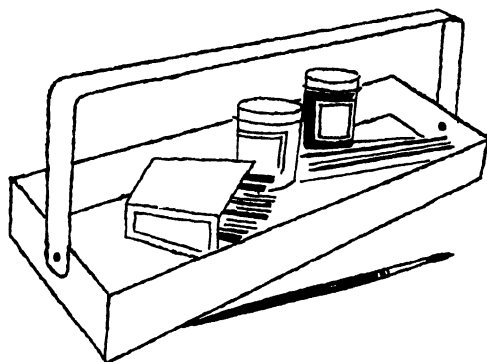
Doodles.

5. AMUSEMENTS for children

This chapter is written especially for the child who is forced to stay in bed. However, every suggestion is equally valid for the healthy child. No attempt has been made to present projects that are entirely creative — indeed, in many cases the “doing” or “making” is all there is to the amusement. Also, some of the amusements have been in vogue since our grandmothers’ day — we selected them for play in bed because children still enjoy them. Notwithstanding, a number of the crafts will introduce the child to a new medium and many of the articles can be used in his work and play.

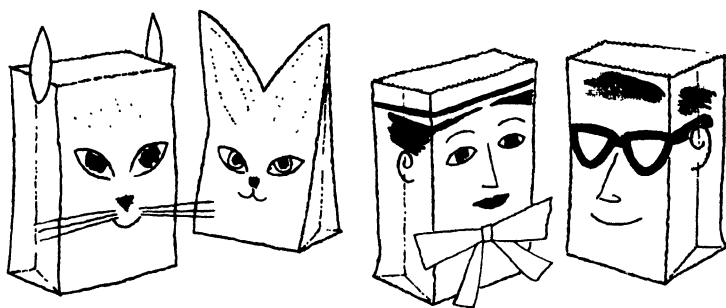
COMFORT IN BED

There are a number of things one can do to make living in bed more comfortable. For instance, have your pin-up lamp hung a little to the left of your head so you won’t have to work in your own shadow. Keep articles you use every day within easy reach and your bedside table close by so you are not always ringing for help. Here are a number of things you can make that will not only keep your things in order, but make your room more attractive.



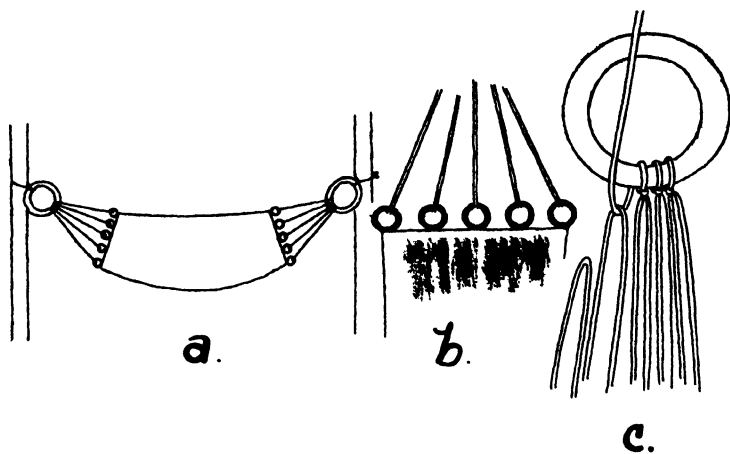
TRAY FOR WORK MATERIALS

This type of a tray is perfect for holding craft materials and working tools. It should be made out of wood to make it sturdy enough to hold all the materials. The handle is attached to the tray with wooded dowels so it can be bent down if you want to store it under your bed or a small area. Smooth all the parts with sandpaper, then add color with crayons.



PAPER BAG CATCH-ALLS

Decorated paper bags similar to the ones illustrated are not only amusing to have in your room, but useful for holding waste materials. You can add features that will make them resemble almost any animal, or you can even make a likeness of a doctor or nurse. The bags can be fastened to the head of your bed or they can be pinned onto the mattress. Features and decorations are most effective when cut out of colored construction paper and pasted in place with cement or glue. If you don't want to go to all this trouble, add them with colored crayons.



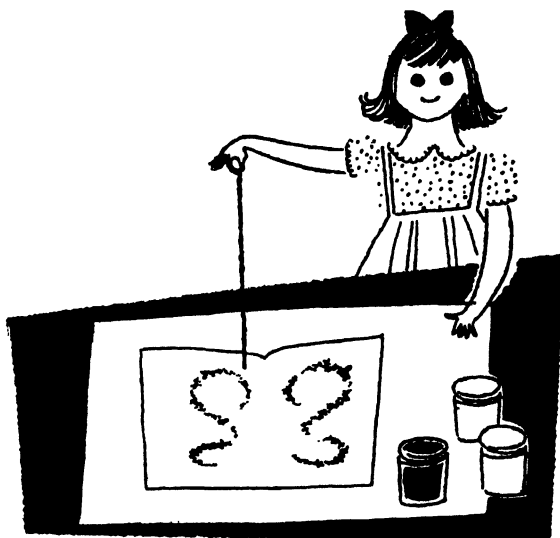
A PULLMAN HAMMOCK

A pullman hammock, like those used in a sleeping car on a train, can be very useful for holding small articles you will use during the day. At night, you can use it for storing some of your daytime clothing. It can be hung either across the top or foot of your bed. The hammock is most attractive when made of a figured material and lined with a plain, contrasting color. Attach a number of small brass rings along each end as shown in drawing "b." These may be purchased in most five-and-dime stores.

Now thread a heavy piece of cord through each ring, carrying it back and forth to a larger ring (used for hanging), as in all hammocks. The loops of cord in the larger ring must be held in place with a separate piece of string as shown in drawing "c." As indicated in the picture, a thinner string is used for this purpose, as the loops must fit inside a single ring.

STRING PAINTING

Do you know that you can paint with a string instead of a brush? Well, you can, but the composition you make will not be realistic — it will consist of contrasting lines and colors. Here is how you do it:



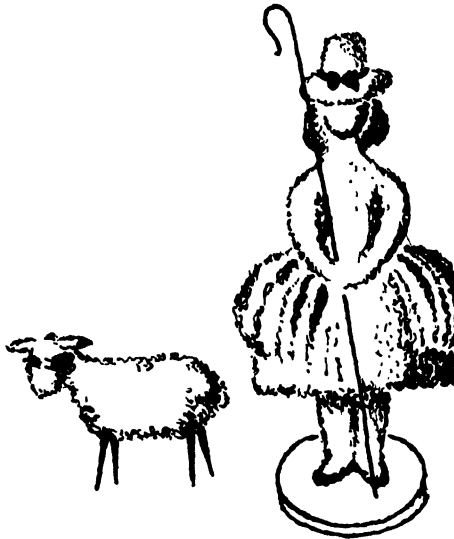
Set out several jars of poster paints (depending on the number of colors you wish to use) on a piece of newspaper to keep the paint from dripping over everything. Next, take a sheet of drawing or shelf paper, fold it in half, and open it out to a flat surface again. Dip a piece of string about twelve inches long into any chosen color of poster paint and, after it is fully saturated, lift it up out of the jar and let the excess paint drip back into it. Now, holding the string high up out of the jar, begin to lower it and arrange it in some sort of a pattern on one half of the sheet of paper. Now fold over the other half of the paper so it covers the string. Place a magazine over the top and press down as hard as you can.

After a few moments, before the paint is dry, open up the paper and remove the string. You will have a repeated design on both sheets. You may add more lines and colors to the same design by using another string and repeating the process. Always allow the paint to dry thoroughly before adding another color.

BREAD SCULPTURE

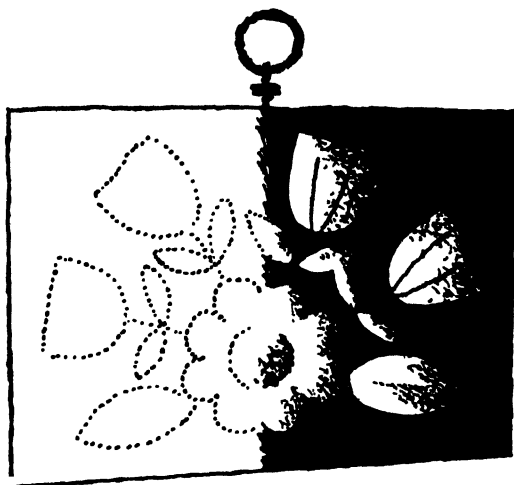
Bread is an excellent medium to use for sculpturing objects, especially if you are in bed. The bread becomes pliable when wet and you can shape almost any small figure without soiling your hands or bed clothes. We are talking about the glutinous type that is so

soft the slices can be squeezed together in your hand without crumbling apart. Another good feature of bread sculpture is that no kiln is needed for preserving the figures. If you place them in a warm, dry room, after a few days they will be almost as hard as if they were made of clay.



Sculpturing in the Round. Just before you are ready to work, dampen a few slices of bread and work them around in the palms of your hands until they become firm and pliable. It is a good idea to remove the top crusts (after they are wet) and lay them aside to use later for decorating the figures. The surface is smooth and tough enough to use for costumes and other features. After the figures are entirely dry, you may add color with poster paint. Finally, give them a coat of plastic spray to make them durable.

The illustration shows how sculpture can be made to stand alone. The body of Little Bo Peep is sculptured around a wooden armature such as a lollypop stick. It is then inserted in a wooden base. The legs of her sheep are made with tooth picks.

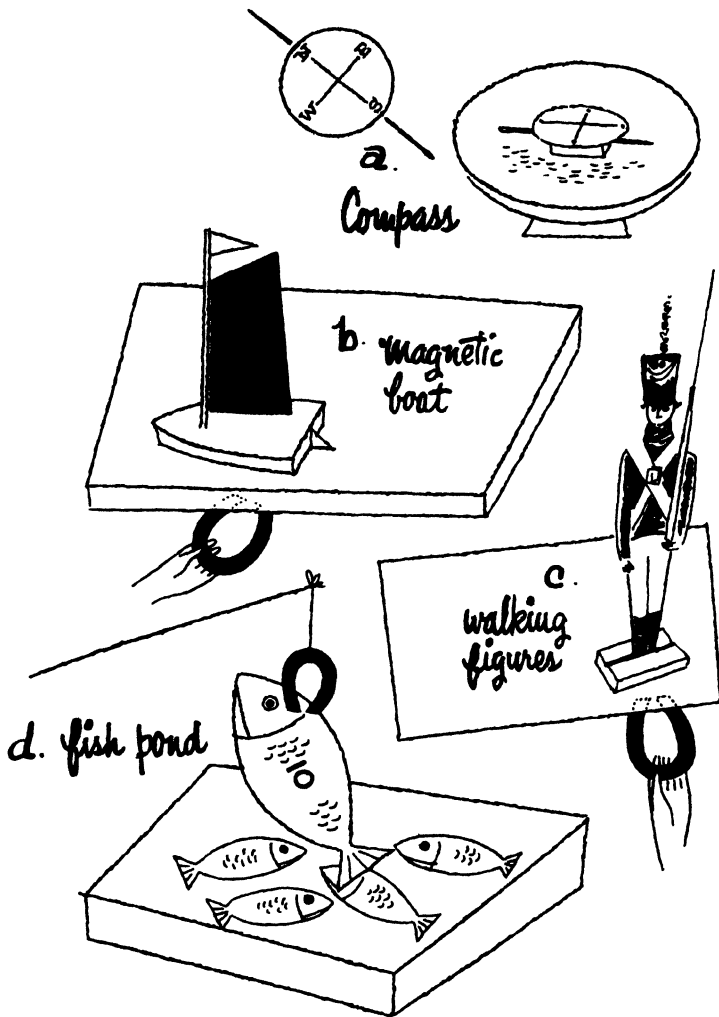


Sculpturing In Relief. First, make an outline of the sculpture according to design and size. Dampen as many slices of bread as you expect to use and work them around in your hands until they become a solid mass. Place a piece of wax paper over the drawing, lay on the dampened bread and shape it according to the outline. The sculpturing is done by adding small bits of bread to parts you wish to have stand up in relief. After the composition is dry, add any color you desire with poster paints. Glue onto a plaque of some kind and cover the whole with a plastic spray.

FUN WITH A MAGNET

A Needle Compass. If you have a magnet, you can make a compass that will tell you which direction is north. Once you have discovered that, you can easily tell which is south, east, and west. It is nice to know directions for many reasons; if your window faces east or west, you can watch the sun rise and set, or, if it is on the south side, plants will grow well in your room. Here is how to make it:

Take an ordinary darning needle and rub the pointed half with a magnet. Run it through a cork so half of the needle remains on either side as shown in drawing "a." Cut a circle out of heavy paper a little larger than the cork and divide it into four equal parts. Mark the ends of the lines, N, E, S, and W. Glue this onto the top of the cork, being sure the letter N is directly above the



pointed end of the needle. Place the cork in a shallow bowl partly filled with water and the point of the magnetic needle will point toward the north.

Magnetic Boat. Would you like to move your own sail boat mysteriously back and forth across to water? First, you must make a little boat with a sail and find a shallow, non-magnetic pan in which to sail it. An aluminum pan will do fine. The body of the boat can be a rectangular piece of wood one-half inch thick or, if you like, it can be a temporary one made out of cardboard. If you want to shape it like the hull of a real boat, make it wide at one end

and pointed at the other as shown in drawing "b." Make the sail or sails out of white paper and use a lollypop stick for a mast. Force the mast through the top and bottom of the sail and on down into the boat. Drill a hole the size of the stick in the exact center of boat and glue the mast in place. The boat must be able to stand alone in order to sail.

In order to make the boat sail, you must attach a piece of tin or other metal underneath the hull to attract the magnet. Find a shallow non-magnetic pan (aluminum) and fill it with just enough water to float the boat. It is necessary to keep the bottom of the boat and magnet as close together as possible. Now hold the magnet against the bottom of the pan and move it back and forth. It will immediately attract the boat and carry it in any direction you wish to move it.

Walking Figures. These little figures are cut out of cardboard and dressed by painting on a costume with crayons or another color medium. A boy might like to make soldiers like the ones shown in drawing "c," or a girl, a family of dolls. Whichever one you choose, the basic structure of the figures are the same.

Make a little wooden base for each figure just large enough to keep it standing erect. Cut a groove along the center into which the figure can be inserted and held in place. Glue a small piece of metal onto the bottom of the stand for the purpose of attracting the magnet.

An aluminum cookie sheet makes the best base on which to move the figures. Place the magnet under the sheet directly under the figure you wish to use, and the figure will move in any direction you wish to take it.

You might dress figures to represent those in your favorite story, such as Little Red Riding Hood. Turn the cookie sheet into a forest by dotting it with small trees and then add a log cabin. Move Little Red Riding Hood and the Wolf along the path with a magnet as you tell the story.

Fish Pond Game. This is a very old game that can be played according to a number of rules. The fish are cut out of tin and features and numbers added with asphalt paint or any color medium that is waterproof. Make a fish pond out of a shallow aluminum pan and cover the fish with a thin surface of water. Use a stick about 36 inches in length for a fishing pole. At one end, attach a string to which a magnet is tied as shown in drawing "d." You are now ready to catch fish with a magnet.

You can make up many rules for playing the game. We suggest you number the fish from one to ten, or as many as you want to make. Take turns fishing, the object of the game being to catch a fish with the highest number, thus adding more to the final score. Place the fish with smallest numbers on top and hide the others underneath. Or, you may anchor them down with some kind of obstacle.

DOLL HOUSES

Small dolls, or even paper dolls, like to live in a real house. It is fun to make one and, with a little planning and many kinds of materials, you can easily create one similar to those shown in the illustration. Start off by finding a cardboard carton in the shape and size you want. One that opens from the top is usually best for most doll houses because you can look down into the rooms while they are being furnished.

In cutting out windows and doors, first plan their size and shape. If you cut across the top and bottom, then down the center of a window, you can bend the cardboard back on each side to form shutters that remain fastened to the house. By the same token, you can cut around three sides of a door and bend the other side back and forth as on a hinge. Decorations or paneling can be added with poster paints or crayons. If you like, divide the interior into different rooms and make furniture out of folded paper.

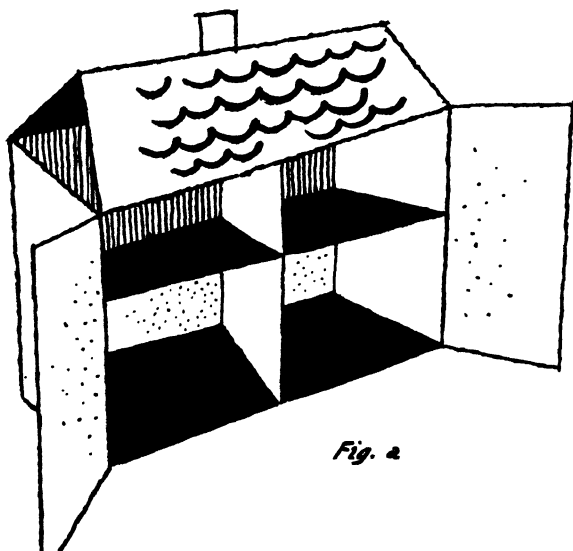


Fig. 2

Figure a. To make this doll house, lift up the two top flaps of a cardboard carton and bend them back for doors. Cut away the other two flaps and turn the carton over on its side as shown in the illustration. Now partition the interior into four rooms by using the two flaps that were cut away from the carton. Decorate the walls of each room in a different color and add furniture made of paper cut-outs.

Fig. b

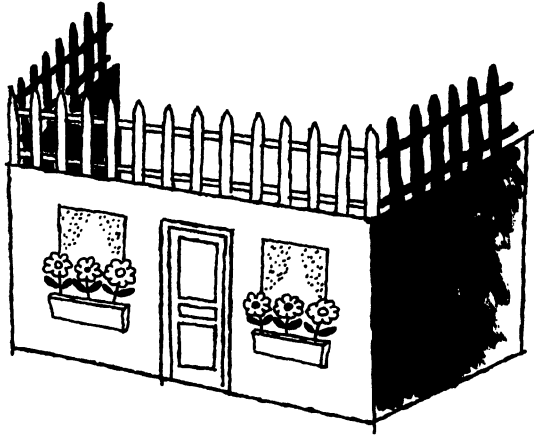


Figure b. To make this doll house, remove one side of a paste board carton and use the opening for the back of the house. The special feature of this house is the decoration—the white picket fence around the roof and the boxes under each window. The whole effect is enhanced by adding plants and flowers cut out of construction paper.

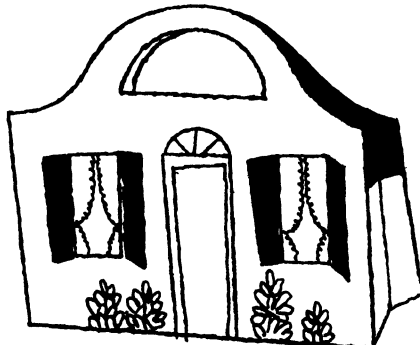


Fig. c

Figure c. Here is a little doll house you can carry with you from place to place. It is made from a carton used for packaging soft drinks. It can be opened wide at the top so you can easily reach in to furnish it.

A TOY VILLAGE

Flat houses are the most practicable for children to make when constructing a toy village, as only the front needs a decoration. Cut them out of thin cardboard and add details with tempera paints or cut-outs from colored construction paper. An occasional house made of a green or red pasteboard box cover would add a pleasant variety and real curtains at the window will add to the effect. (Drawing "a.")

There is no rule as to the size of the buildings; but it is best not to have them too large, as they will not stand erect if made too high. Nine inches from floor to peak of roof and seven and one-half inches wide is a good measurement for the largest house. The houses should be of various shapes and sizes; if you want it to look like a real village, add a church, school, store, and an occasional barn. (Drawing "b.")

After the houses are made and decorated, set the smallest in the background and the largest in front — this will give the illusion of distance. Add a white picket fence cut out of construction paper, some green trees of varied shapes, and a flagpole on the village square. You can also cut out figures of men, women and children from magazines, to give life and variety to the village streets.

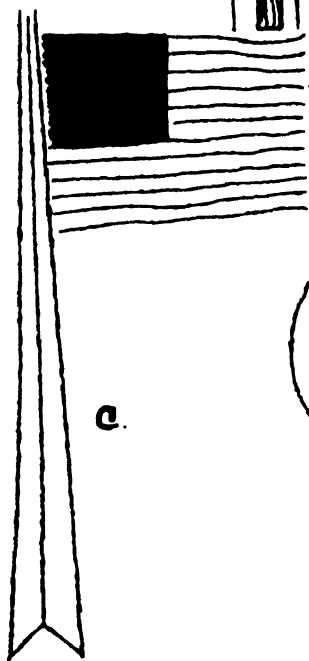
The flagpole is made to stand by taking a strip of paper about one-half inch wide, folding it in half along its length, then opening it out so the two sides form a right angle at the base (drawing "c."). A small tree, if top-heavy may be strengthened by pasting such an "angle iron" along the trunk and up to the top (drawing "d").



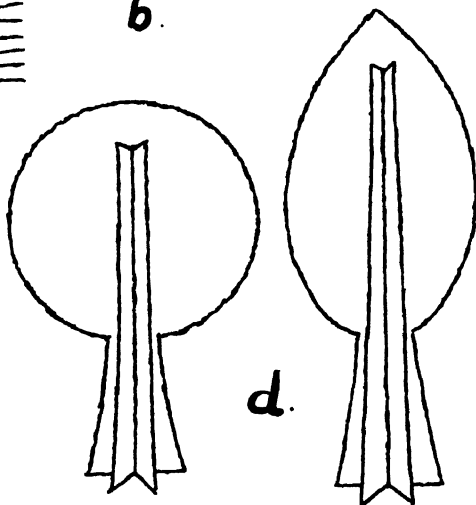
a.



b.

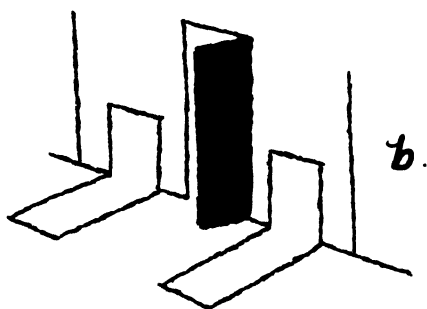
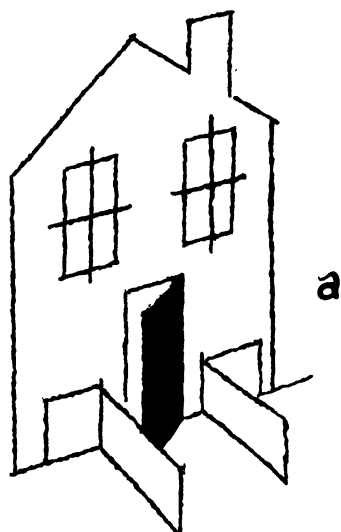


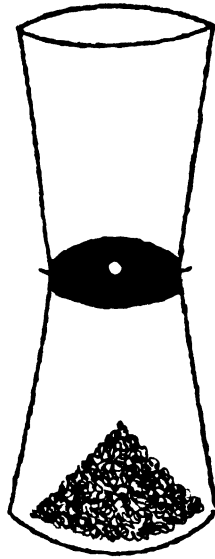
c.



d.

On the back of each house paste two "feet" about three-fourth inches wide and two and a half inches long in order to make them stand erect. These are but small pieces of the same material of which the houses are made. Be sure to paste each foot down to the *very lower edge* of the house as shown in drawing "a." If pasted as shown in drawing "b," there is nothing to prevent the feet from folding up like a hinge and falling backward.





HOUR GLASS

This really is a *minute glass*, but everyone calls it an “hour glass” because glasses like this were originally made to run for an hour. If you would like to make one that will run, say, three or five minutes, this is how to do it:

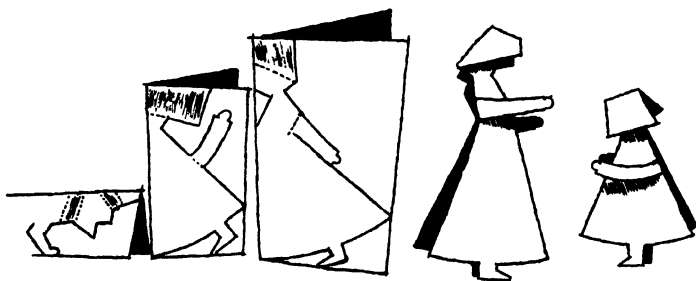
Decide on the time limit for your hour glass and find two transparent containers of equal size with straight walls. Place one above the other with a thin piece of metal or cardboard between. Punch a small hole in center of partition just large enough to allow a small trickle of sand to run through.

Place a good amount of sand in the top jar and time it with a watch until it runs through for the amount of time you have decided on for your hour glass. At the end of the period, quickly turn the containers on their sides so the sands stop running. Now empty the sand out of top container and seal the two together with the divider between. It will take the same amount of time for the sand to run through each time the hour glass is turned upside down.



STORY TELLING IN BED

Story telling in bed can be a wonderful pastime if you make your own characters and place them in a setting like the little boy in the drawing. As you can see, his story is about a shepherd and his dog watching over a flock of sheep. Hills are represented by mounds made in the bedclothes with his knees and feet. An occasional green paper tree will make the landscape more realistic. The characters are easily made out of paper once you know how to do it.



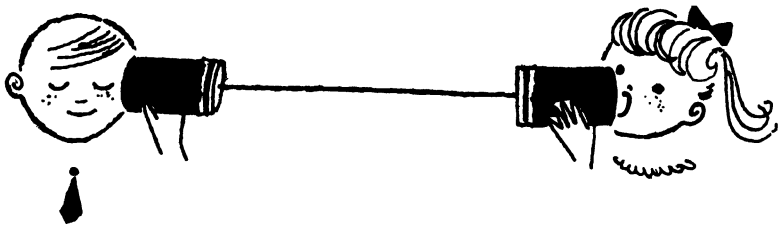
Figures

The size of the figures may be made according to the wish of the boy or girl, but all must be in the same proportion. All characters are symmetrical and are cut from paper folded down the central line. In a human figure, the line is down the front; in an animal, it forms the back. To find the position in which they will balance when standing requires some experimenting, but all can be made to stand and much expression can be given them with a little practice.

Animals

Sometimes the ears of animals are cut from the neck, and sometimes at an angle. A drooping tail folds into the body at the base; an uplifted one folds over. If there is to be a double joint in the neck, for the best results fold over and under. The same with the heads. A pinch here and there in the legs, which are best cut a little heavy, will help animate the body.

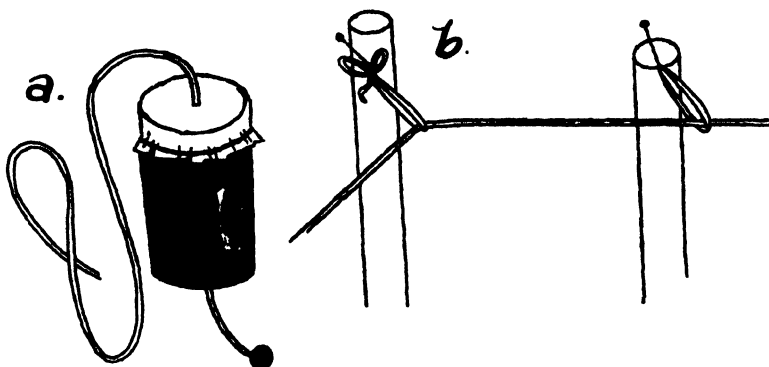
Trees are made by cutting an unfolded strip of paper in strips two-thirds through; fold or twist the uncut third for a trunk and curl branches with a knife blade. Be sure to cut the base large enough to support the tree.



A STRING TELEPHONE

It is fun to carry on a private conversation with a friend in another room, especially if you are in bed. This can be done on a string telephone which will carry your voice along a slender line to a distance of fifty feet — perhaps farther. Here is how the telephone is made:

Find two medium-size tin cans and remove both ends with a can opener. Cover one end of each can with a piece of heavy paper and secure in place with a string as shown in drawing "a." Now cut a piece of cord the desired length you want to use and wax it (a candle will do the trick); then tie a knot or button on one end. Carefully punch a hole in the center of each drum with a large needle or pin and cautiously pull the string through until the knot or button rests on the inside surface of one drum. Do exactly the same thing with other end of string so that you have a tin can secured at both ends of string.



The telephone is now ready for use. If the distance is short, the line may be stretched taut from person to person. But if you wish to speak to someone in the next room, supports will be needed and loops must be made of string and fastened at intervals for the telephone cord to pass through (drawing "b"). Always keep the course of the waxed string as straight and taut as possible, and try to avoid sharp angles.

PUPPET THEATRE

Here are two types of puppet theatres a child can make and operate by himself. Both are perfect for story telling in bed — they rest on top of a pillow and the hands that move the puppets are hidden in back while the play is in progress. Both theatres are made from a cardboard carton, the size depending on age or choice of the child.

Figure 1a. This theatre has a number of tracks cut out of the bottom of the carton for the purpose of moving puppets back and forth while the play is in action. The puppets are flat, like paper dolls, so they can be pushed up and down through the openings in the floor. Since the hands must be directly underneath the theatre in order to animate the characters, place only the front part of the stage on top of the pillow and use other props on the sides to hold it in position.

Figure 1b. In order to control the puppets and move them around during the play, a handle must be attached in order to hold

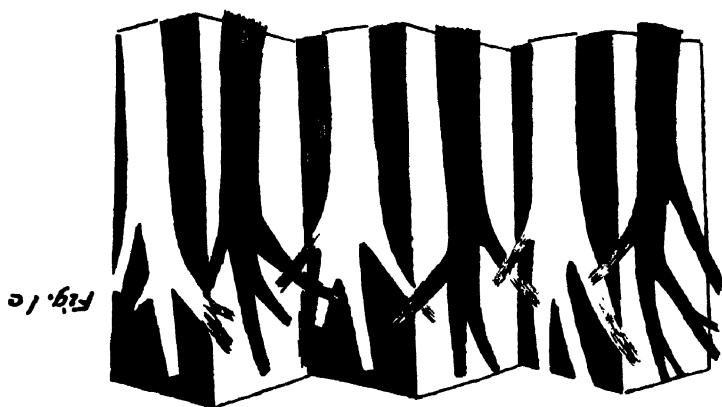


Fig. 1c

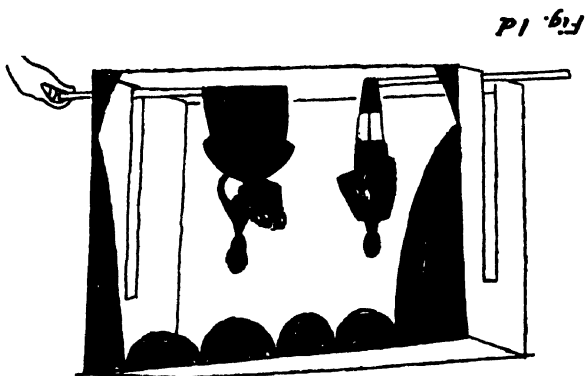


Fig. 1d

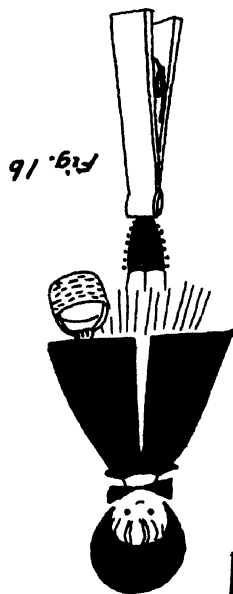


Fig. 1b

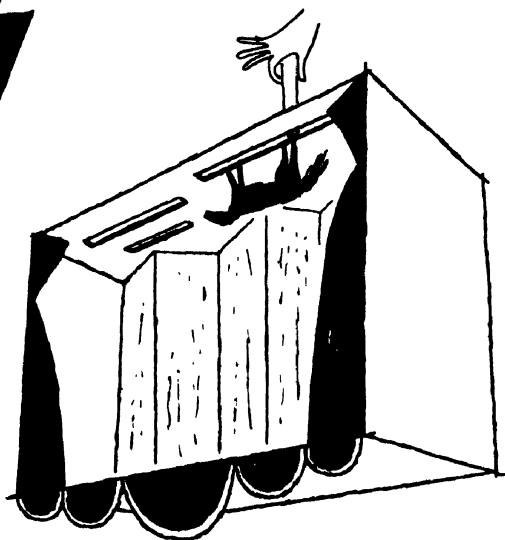


Fig. 1a

them in the hand. A pinch-type clothes pin will serve the purpose, as shown in the illustration.

Figure 1c. It is necessary to have backdrops of some kind to indicate the setting for each play. It is a good idea to paint them on separate pieces of paper or cardboard rather than directly on the carton. They can then be used for other plays. Figure 1c shows a novel backdrop to indicate a forest. It is made of heavy paper, folded in accordion pleats approximately one inch wide, which will enable it to stand alone. Make trees of different shapes and staple one onto each pleat. This will give a three-dimensional effect to the forest.

Figure 1d illustrates a theatre where the puppets are operated from either side of the stage. Cut out an opening approximately one and one-half inches wider than, and as high as, the tallest puppet. This theatre rests directly on top of a pillow and is operated with hands resting on either side. For this reason, select a carton small enough for the small arms of a child to be able to reach around it in order to operate the puppets. Fasten a small wooden dowel to each puppet as shown in the illustration. The puppets may be flat or in the round.

THE YOUNG MAGICIAN

Hand Tricks

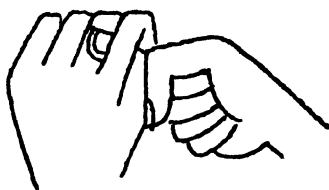


Fig. 1

Broken Thumb. To pretend your thumb is broken, place your left thumb between the first and second fingers of your left hand, being sure to pass it through as far as possible. Next bend your right thumb and place the first joint as nearly as possible at right angles to the thumb of your left hand and allow it to rest against the second joint as shown in Figure 1. If you separate the hands a little, it will appear as if the first joint had been pulled off your right thumb.

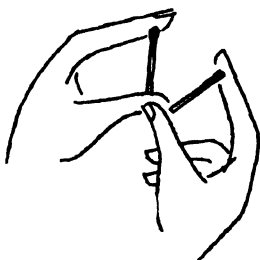


Fig. 2

Match Trick. Always use safety matches to perform this trick. Hold a match between each forefinger and thumb and explain to your audience that you are able to *pass two matches through each other*. The secret of the trick is to wet the tip of your right forefinger just before the trick is performed and push the match against it until it sticks tightly to your finger. As the hands approach each other, lift the right forefinger quickly to allow the other match to pass underneath. The fingers are then brought back to the original position and the matches are linked together.

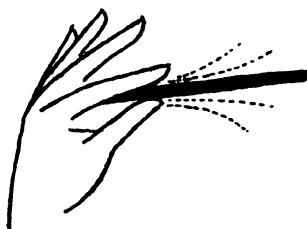
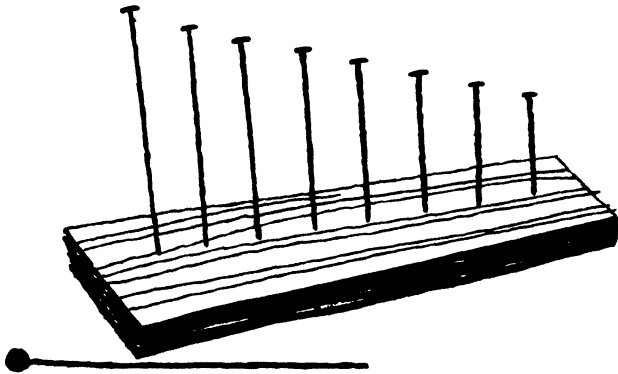


Fig. 3

Rubber Pencil. The object of this trick is to make a pencil appear as if it were made of rubber. The illusion is caused by holding the pencil lightly between the index finger and thumb and moving it up and down quickly so the center appears to stretch up and down while the end remains stationary. To do this, one must attain a certain rhythm which will require some practice. It is attained by moving the arm up and down with a *jogging* motion and at the same time moving the pencil up and down *quickly* with the thumb.

Giving Away a Coin. The trick is performed by first sticking a little piece of chewing gum on the end of your right thumb. Then, speaking to a friend, you show him a coin and tell him to put it in his hand; press it down hard on his palm with your thumb while talking to him and looking him in the face. Suddenly take away your thumb and the coin will adhere to your thumb; close his hand at the same time and he will be under the impression that he still holds the coin as the sensation caused by the pressing still remains. You tell him he may keep the coin, but on opening his hand to look at it, he will find to his astonishment that it is gone!

ENTERTAIN YOURSELF WITH MUSIC



Pin Harp

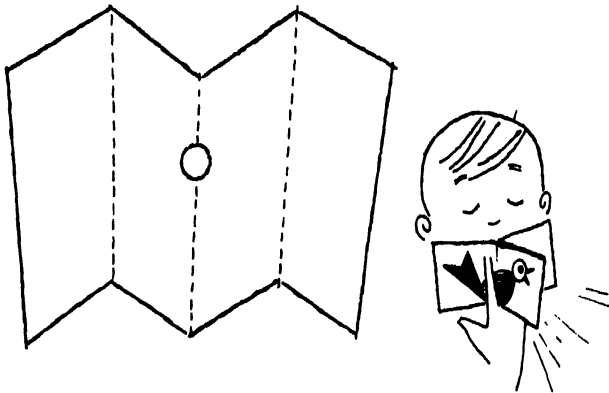
This, of course, is just a play musical instrument, but you can get eight different tones and can pick out a tune on it. The different tones depend on the length of pins in the harp. Cut a flat piece of wood about 2" x 6" and drive eight pins along the top, making each pin a little deeper than the previous one. That's all. To play a tune, pluck each pin with another larger one. With a little practice, you can pick out a musical tune.

Hummers

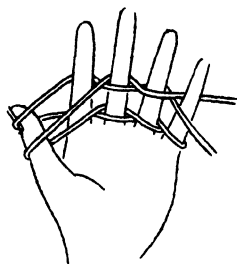
Perhaps you have wrapped paper around a comb, placed it against your mouth, and hummed a tune. The tone is not only increased but accelerated. The same rule also applies to the hummers illustrated here. The tube hummer is made from a mailing tube about twelve inches in length. Decorate it with artist's colors and any design you choose. Cover one end with tracing paper and punch eight or ten holes in it with a small nail or sharp instrument.

Another type hummer is made out of paper. Cut a rectangular piece of paper in a size that when folded will form four squares as shown in the illustration. Cut a small hole in the middle fold, which is then held against the lips while you hum. The hummer will look more impressive if decorated with some kind of a design.

Playing on a hummer is an excellent pastime, particularly if you are trying to memorize a tune. Children also use them to accompany a rhythm band.



STRING TRICKS

*Fig. 1*

To perform this trick, take a string about a yard in length and tie the two ends together. Begin by placing the loop over the little finger of left hand as shown in Figure 1, running the strings between each finger and crossing them until you reach the thumb. The strings are then passed around the thumb and drawn toward the palm of the hand. In threading the string back between the fingers, cross the front string over the back string and continue until you have passed the little finger. Release both loops from the thumb and have someone pull on opposite ends of the string. The string will pass through all the fingers and drape away from the hand.

String and Ring Trick. First, tie two ends of a string together to form a loop. Thread one end of the loop through a ring and slide the ring along to the center of the string (see Figure 2). Slip the ends of the loop over the forefingers of a friend and suggest that you can remove the ring without removing the two loops around the fingers. It is done by first sliding the ring up close to one finger.

1. Grasp the string that forms the side of the loop nearest your friend's body. Take hold of it just to the right of the ring (Figure 2).

2. Loop this string over the friend's right forefinger, being careful to start the loop on the side of the finger that is on the outside, or away from, his body. In other words, the loop is made by passing the string around the finger from front to back.

3. Now lift off the loop that was originally around the friend's right forefinger and the ring will be released.

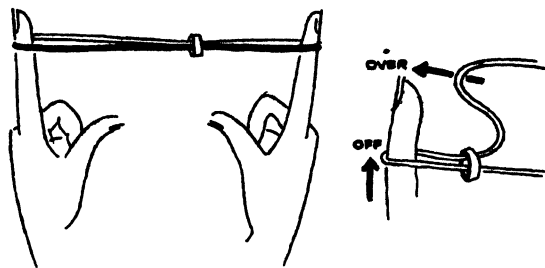


Fig. 2

The Dissolving Knot. This trick is performed with a piece of string about fifteen inches in length. Make a half knot in the center and then tie both ends together as shown in Figure 3. Now ask if anyone can untie the center knot without untying the two ends. This can be very mystifying unless you know how it is done. Here's how:

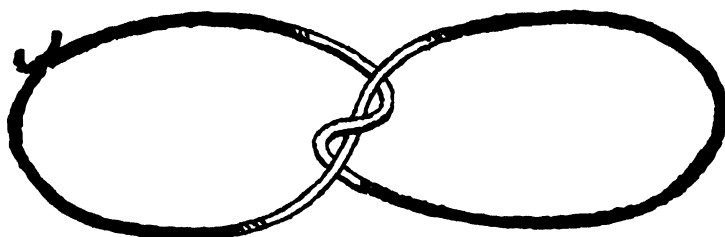


Fig. 3

When you are ready to dissolve the knot, cover your hands over with a handkerchief. Simply grab the strings below the center half knot and force it up against the knot that holds the two strings together. The center knot will merge with it so it will not be seen.

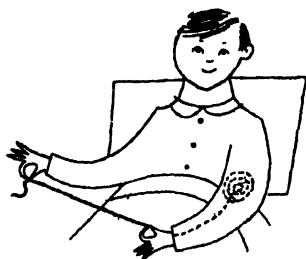


Fig. 4

String from Nowhere. Begin the trick by showing that both your hands are absolutely empty. Then, to make the deception more real, pull up both sleeves to show that nothing is hidden underneath the cuffs or inside the lower part of sleeves. This done, hold up your right hand with fingers closed to make a fist. Now, with the left hand begin slowly to draw from within what seems to be an endless piece of string.

The trick is accomplished by rolling up a ball of string beforehand and fastening a small bead or button to the end. Secrete the rolled up ball under your sleeve in the crook of the left elbow as shown in Figure 4. When you show that both hands are empty, you naturally pull up your right sleeve with your left hand. Next, pull up your left sleeve with your right hand, grasping the button at the elbow and gaining possession of the hidden string. It is now time to perform the trick.

Grasp the bead or button attached to the end of the string with the fingers and thumb of your right hand and pull the string out, keeping the movements slow to make the string seem as long as possible.

OTHER MAGIC TRICKS

Mysterious Boat. Make a toy boat out of cardboard or a thin piece of wood as shown in Figure 1. To make it more realistic, cut a boatman and oars out of construction paper and place them in the center of the boat. Now water-proof the bottom of the boat by giving it a coat of glue or "dope" such as is used for model airplanes. With a short piece of string, attach a small piece of gum camphor (you

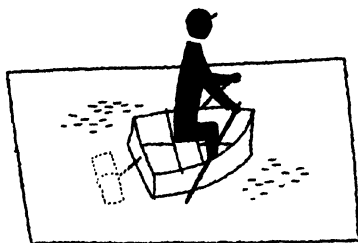


Fig. 1

can buy it in any drug store) to the back of the boat as shown in the illustration. Place the boat in a pan of water and the action of the camphor in the water will make the boat move mysteriously about!

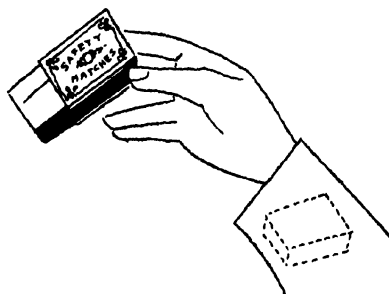


Fig. 2

A Magic Money Bank. Make yourself a magic money bank out of a penny match box. Paint it in gay colors and cut a slit across center of top for receiving coins. Now shake the bank in front of your audience and say "Sounds like I have a lot of money, don't you think? I must be getting rich!" Since your friends will hear the jingle of the coins, they will agree with you. But, when you open it, the box will be empty!

Look at Figure 2 and you will see how the trick is accomplished. Another match box is filled with some coins and hidden inside your sleeve. When your friends hear the jingling, they will think the coins are in the bank held in your hand.

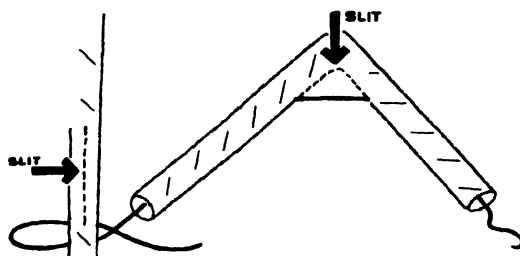


Fig. 3

Straw and String Trick. This little trick will make your friends think you are a real magician. The idea is to be able to cut a drinking straw in half without cutting a piece of string that has been drawn through the center of the straw.

Pass a string about twelve inches in length through an ordinary drinking straw. Now bend the straw in half so it forms an acute angle and cut it along the bend with a pair of scissors. It should be obvious to everyone that the string is also cut in two, yet it has remained in one piece!

The trick is accomplished by preparing the straw ahead of time. Cut a small slit in the center as shown in the illustration. When the straw is bent for cutting, keep the slit on the side next to you and be sure the string is pulled tight. You must conceal the string with the left hand which is holding the straw while cutting it with scissors held in the right hand. The straw is in two pieces while the string remains whole!

THE MIRACULOUS APPLE AND BANANA

Here are two tricks you can play on your friends if you prepare for them beforehand while they are not looking:

1. **Divide an Apple Inside Rind.** Pass a needle and thread through the rind of an apple, starting at the top and forcing it down to the bottom. Now put the needle in the same hole it came out of and pass the needle up through the other side until you have gone around the apple. Take both ends of the thread in your hands and pull up on them at the same time. This will cut the inside of your

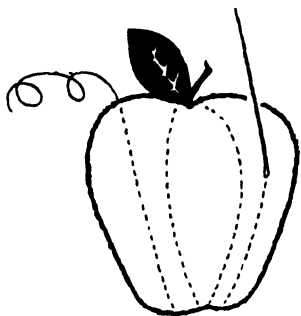


Fig. 1 a

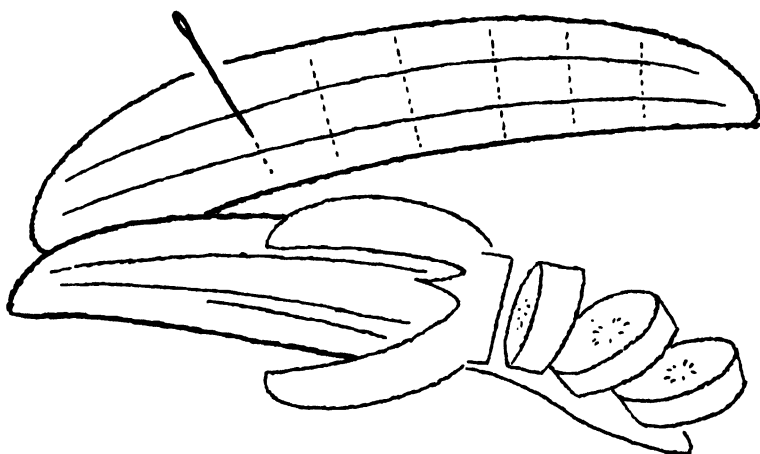


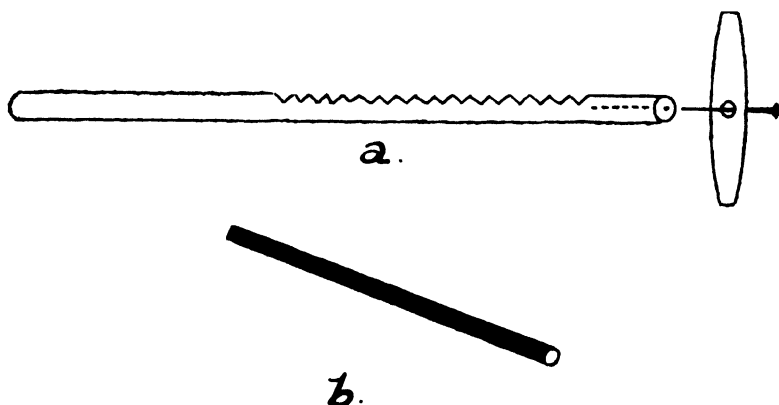
Fig. 1 b

apple into two parts. In the same manner, you can divide it into as many parts as you please, yet the rind remains whole. Give the apple to a friend to peel and it will immediately fall into parts.

2. *Divide a Banana into Sections.* Another good trick is to divide a banana into sections so that when your friend peels it, the slices fall out without being cut. To do this, you will need a large needle or pin to do the cutting. The sections are made by forcing the needle or pin into the rind at intervals (according to thickness of slice) and twisting it around so the point follows the inside of the skin. No one will notice the holes after the needle is withdrawn and, when the banana is peeled, lo and behold, it falls out in slices!

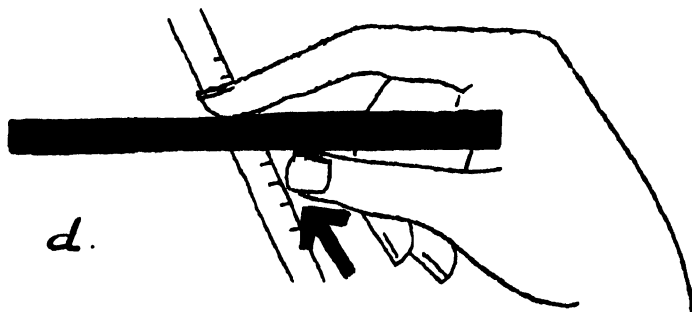
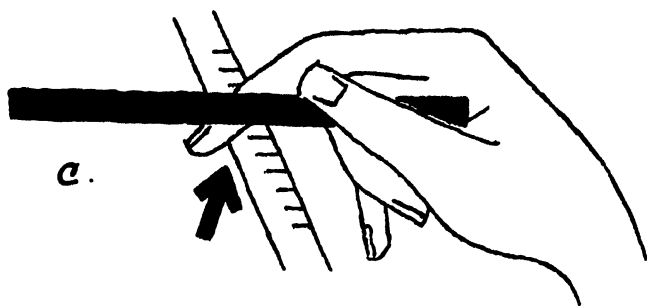
LIE DETECTOR OR GEE-HAW STICK

This is an Indian game based on a legend that there was once a magic stick that could answer "yes" and "no." It is easy to make and, if you don't tell your friends how to operate it, you can have lots of fun with it. Because it responds much like a mule, it is sometimes called a Gee-Haw Stick. While rubbing the stick one says "Gee" and the propeller turns to the right; if one says "Haw" and rubs it the other way, it goes to the left. Or, if you want to use it as a Lie Detector, ask a person a question that can be answered yes or no. If the answer is truthful, the propeller will turn to the right; if false, it turns in the opposite direction.



To make the game, use a thin stick or wooden dowel approximately 12" x $\frac{1}{2}$ ". Cut a number of notches (10 or 12) in one end of the stick and leave room for a handle at the other as shown in drawing "a." Sandpaper the notches until smooth. Make a flat propeller from an ice cream stick or tongue depressor. A thin piece of tin may also be used. Attach it to the notched end of the stick with a small nail or screw and leave enough room to allow it to turn easily.

To operate the game, hold the notched stick in the left hand and a small straight stick or lead pencil in the other and rub the stick or pencil back and forth rapidly over the notches. As you do this, the propeller will begin to spin. By making contact with the



stick with the index finger (c) just below the notches and moving it along with the stick or pencil, it will cause it to turn to the left. Now shift the position so the thumb makes contact on the opposite side of notches and it will spin in the opposite direction (d).

You can decide for yourself which direction indicates "Yes" or "No," "Gee" or "Haw."

6. ENTERTAINING yourself with music

By Raymond Burrows

WE'LL BEGIN by throwing caution to the winds and saying that *everybody* enjoys some kind of music and *everybody* should engage in musical recreation of some kind. Of course, we have met people who say that they can't enjoy music because they don't understand it; the answer to that is either they have not found the particular kind that will appeal to them or else they have for one reason or another got the idea that musical understanding and appreciation are only to be arrived at by hard effort, for which they may not have the time or opportunity. Even people who say they are "tone deaf" find pleasure in certain rhythms and feel a response to some melodies and harmonies more than to others.

It is not necessary to be a virtuoso or a full time student to get a great deal of fun from singing a little, playing a simple instrument, and having some understanding of the different kinds of music.

SINGING FOR FUN

Whether you "have a voice" or not you can have lots of fun singing all by yourself. Never resist a snatch of song or melody if it comes to you, for who can tell what other inspiration it may bring with it? For every recorded melody there are hundreds that have served their purpose by expressing momentarily the feeling that inspired their creation.

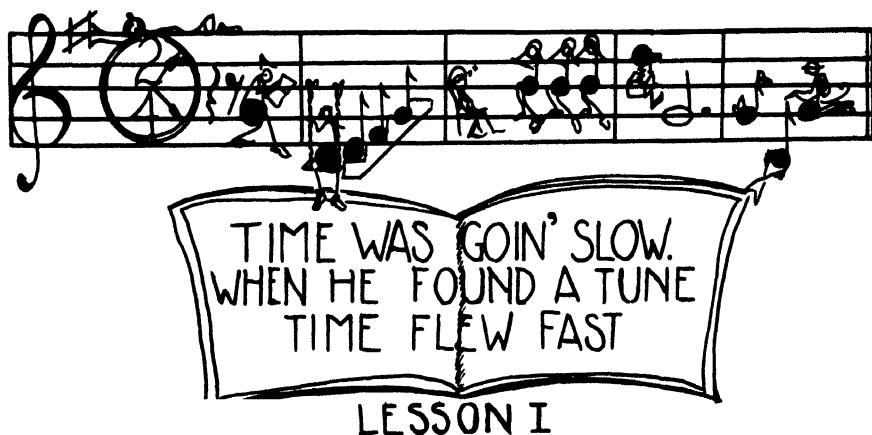
Our American tradition of song has sprung—like all folk music—from the daily lives of our people; the great spirituals were born of the oppression of slavery; the cowboy and pioneer songs from the struggles and joys of those days of elemental living when half the continent was open country. In ballad and folk song could be read a fairly accurate history of the various phases of our country's development.

But, to get back to singing by yourself, you probably remember some member of your family who entertained you as a child by singing. Don't you recall how the words delighted you almost as much as the tunes? That is one of the secrets of enjoying singing, either alone or with others—to know the words as well as the music.

Several years ago a group of American music students made a study trip to Europe. After listening to native music wherever they went, they were usually asked to sing some American songs. It was a shock to their leader to discover that there was not a single American song (including the National Anthem) for which they knew more than one verse. Probably most Americans would have found themselves in the same position.

So the very first suggestion we would offer is that you learn all the words of a dozen or so songs which have a special appeal for you. If you start giving vent to yourself in song you will shortly find yourself acquiring colleagues who will want to harmonise with you, and by having the words well in mind you will be able to devote yourself to making the most of the music.

If you can't read music, try a little harmony anyway. Invent a higher or lower part while someone else sings a melody. You may have to close the door and make it a secret session but if you should chance on a good second part you will get the authentic creator's thrill. An "um-pah" bass will add



to the effect if someone can sing in low register. An easy example of this is the following:

THE MORE WE GET TOGETHER

The musical score is written in 4/4 time with a key signature of one sharp (F#). It consists of five systems, each with a vocal melody line and a low-register accompaniment line. The lyrics are written under the vocal line, and the low-register line is marked with 'Um' and 'pah' syllables.

System 1:
 Oh the more we get to-
 Um - pah Um. pah Um -

System 2:
 ge-ther, to- ge-ther, to- ge-ther, Oh the more we get to.
 Um - pah Um pah

System 3:
 ge-ther The hap-pier we'll be. For your friends are
 Um. pah Um. pah

System 4:
 my friends, And my friends are your friends, So the more we get to.
 Um - pah Um. pah

System 5:
 ge-ther, the hap-pier we'll be!
 Um - pah Um...

Some songs will require a variation from these two tones, but your ear will help you.

A favourite way to get harmony is through the familiar round. There are many ways to start and stop a round. An informal way is for one person to start singing and then have others join without any given signal. When each has sung the round through several times they stop without a signal. You probably know the most familiar rounds—"Row, Row, Row Your Boat," "Lovely Evening," "My Goose," and "Frère Jacques." Many delightful rounds and suggestions for their use will be found in "Rounds and Canons" by Harry Robert Wilson (Hall and McCreary, Chicago). Here is a new one you might like to try:

THE QUAIL

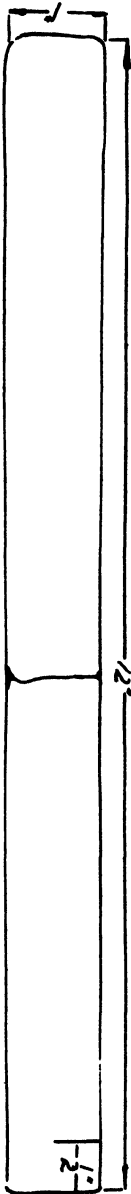
Words and Music by Raymond Burrows.

Oh, hear the bird in the mea-dow sing,

His voice sounds clear in the ear-ly spring

"Bob White, Bob White, Bob White!"_____

After singing "The Quail" as a round, try whistling the third line each time.

[illegible]

A SHEPHERD PIPE

You can make a shepherd pipe for yourself by following the directions given below and, what is more, you can learn to play it even though you have never had a music lesson. This instrument has a very pleasant tone and is a good one to begin with, easy to make and to play.

You will need a piece of bamboo twelve inches long and one inch thick. Bamboo cut in proper lengths can be bought from firms selling handicraft and scouting supplies. You will also need a cork to fit tightly into the end of the bamboo tube. For tools, a pen-knife or other good knife, and a small saw—preferably a coping saw—are required. A set of files will make the job easier; one long round file, and three small ones—flat, round, and three-cornered.

1. First use the long file to make the inside of the bamboo clean and smooth.
2. Select the end farther away from the joint, measure one-half inch from this end and saw half way through. (Fig. 1, A & B.)
3. Work from the same end, mark about one-third inch down (Fig. 2.) and cut slantwise to meet the end of the first cut, so as to leave the mouthpiece looking like Figure 3.
4. Cut a window on the top side, one inch from the end of the mouthpiece. The window should measure one-half inch across the tube and one-quarter inch lengthwise of the tube. Clean the edge of the window with your file and make the side away from the mouthpiece slantwise. (Fig. 4, A. & B.)
5. File an air passage from the end of the mouthpiece to the window, using the flat side of your three-cornered file. (Fig. 5, A & B.)
6. File your cork into a perfect cylinder just the right size to fit snugly into the tube. If it looks like Figure 6, make it look like Figure 7.
7. Flatten one side of the cork to match the air passage in the mouthpiece (Fig. 8, A & B) and shove it in until it reaches the edge of the window. (Fig. 9, A & B.)
8. Cut off the end of the cork and cut it slantwise to match the mouthpiece you have cut in the tube. (Fig. 10.)



9. Now blow gently into the pipe through the wind passage. The tone you get is the lowest note possible according to its length and bore. You can, if you wish, use whatever pitch you happen to get, but for convenience in tuning and uniformity if you have several Shepherd Pipes, we suggest that you tune to D (the next white note after Middle C, between two black keys in the centre of the piano keyboard). (Fig. 11.)

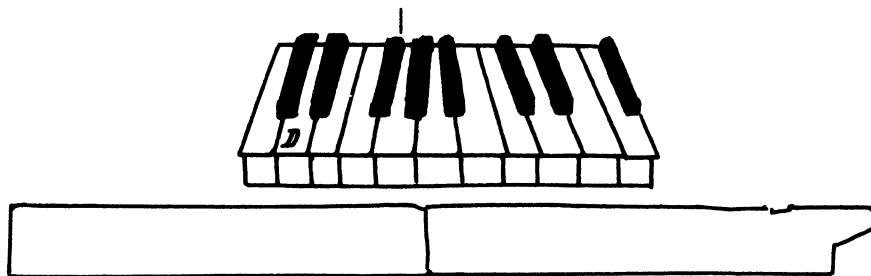


Fig. 11

Sound your low tone. It will probably be a little lower than the middle D, and the way to raise it is to cut off the end of the pipe until it is high enough. Cut off not more than one-quarter of an inch at a time. You can raise a pitch by shortening the pipe but you cannot lower it.

10. When you get your D tone, measure off one-quarter of the length of the whole pipe and mark the first hole, starting from the end away from the mouthpiece. Make a small hole and sound it. It should sound the next note of the scale (E on the piano.) (Fig. 12.) If it sounds flat, use the file to bring it a little nearer to the mouthpiece. If it is sharp, use a little plastic wood to move the hole farther away from the mouthpiece. Be sure this tone is the right pitch before continuing.

11. Now add another hole about seven-eighths of an inch nearer the mouthpiece. Tune as before to the third note of the scale. (Fig. 13.)

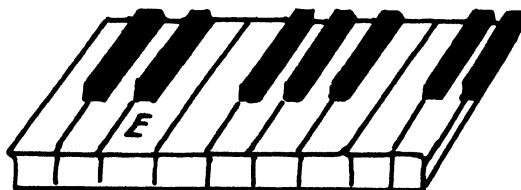


Fig. 12

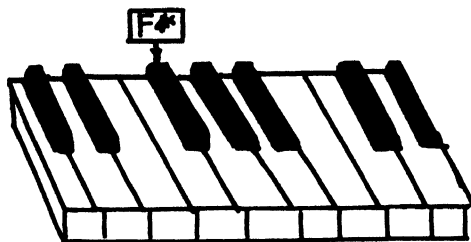


Fig. 13

12. Lessen the distance between holes, and continue until you have six holes, the last two three-quarters of an inch apart. Tune each hole before making the next. Your ear will tell you how it should sound, but compare it with a piano if there is one at hand. (Fig. 14.) You can also use a pitch pipe for tuning.

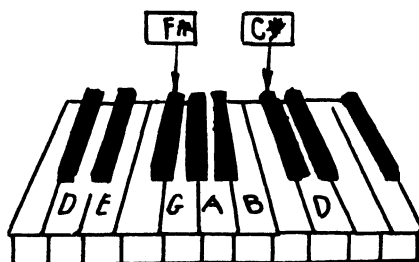
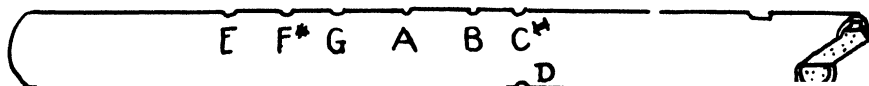


Fig. 14

13. Now make the last hole on the underneath side, directly under the hole nearest your window. This will sound D an octave higher than your first tone and gives you the complete Shepherd Pipe. (Fig. 15.)



COMPLETE SHEPHERD PIPE
SEVEN HOLES

Fig. 15

PLAYING THE SHEPHERD PIPE

Hold the pipe as shown in Figure 16 and number each note according to the number of holes covered. For example, when only the left thumb is down, we will call the note "1." When all seven holes are covered, we will call the note "7." Follow this system of numbering and play these familiar tunes. If you can read music, you may find it easier to play by note instead of by number.

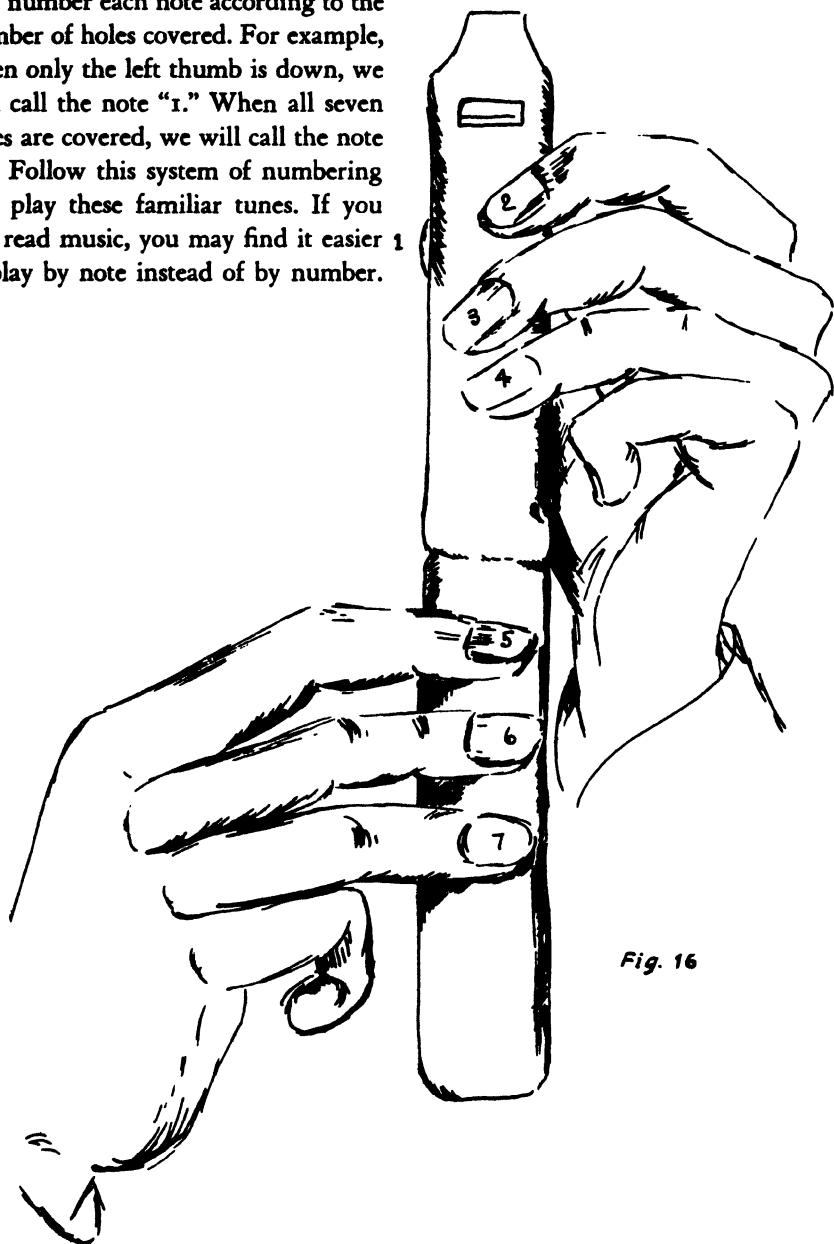
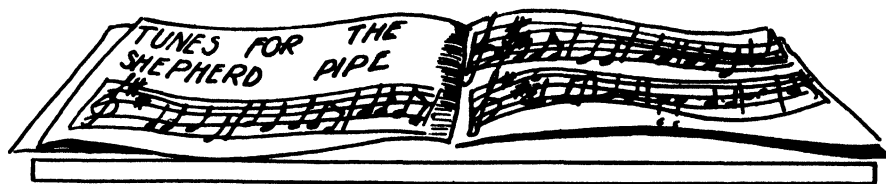


Fig. 16



OH, SUSANNA

7-6 5 3 3 2 3 5 7 6 5 5 6 7 6
 I come from A-la-ba-ma with a ban-jo on my knee,
 7-6 5 3 3 2 3 5 7 6 5 5 6 6 7
 I'm goin' to Lou-si-a-na my Su-san-na for to see;
 7-6 5 3 3 2 3 5 7 6 7 5 6 7 6
 It rained all night the day I left, the wea-ther it was dry,
 7-6 5 3 3 2 3 5 7 6 5 5 6 6 7
 The sun so hot I froze to death, Su-san-na, don't you cry.
 4 4 2 2 2 3 3 5 7 6
 Oh, Su-san-na, Oh, don't you cry for me,
 7 6 5 3 3 2 3 5 7 6 5 5 6 6 7
 For I come from A-la-ba-ma with my ban-jo on my knee.

FOR HE'S A JOLLY GOOD FELLOW

7-6 5 5 5 6 5 4 5 5 8 6 6 7 6
 For he's a jol-ly good fel-low, for he's a jol-ly good
 5 7
 fel- low,
 6 5 5 5 6 5 4 2 2 3 3 3 4 6 7
 For he's a jol-ly good fel- low, which no-bo- dy can de- ny.
 5 3 3 3 2 2 3
 Which no- bo- dy can de- ny,
 Which no- bo- dy can de- ny,
 7-6 5 5 5 6 5 4 6 5 6 6 6 7 6
 For he's a jol- ly good fel-low, for he's a jol- ly good
 5 7
 fel- low,
 6 5 5 5 6 5 4 2 2 3 3 3 4 6 7
 For he's a jol- ly good fel- low, which no-bo- dy can de- ny.

AU CLAIR DE LA LUNE

4 4 4 3 2 3 4 2 3 3 4
 Au clair de la lu-ne, Mon a-mi Pier-rot,
 4 4 4 3 2 3 4 2 3 3 4
 Pre-te moi ta plu- me, Pour e- crire un mot;
 3 3 3 3 6 6 3 4 5 6 7
 Ma chan- delle est mor- te, Je n'ai plus de feu
 4 4 4 3 2 3 4 2 3 3 4
 Ou- vre moi ta por- te, Pour l'a- mour de Dieu.

LONDON BRIDGE

3 2 3 4 5 4 3 6 5 4 5 4 3
 Lon-don Bridge is fal- ling down, fal-ling down, fal-ling down,
 3 2 3 4 5 4 3 6 3 5 7
 Lon-don Bridge is fal- ling down, My fair la-dy!

Besides playing these tunes, you can find many others by ear and can make up your own tunes. You can also play the tunes fingered for the Ocarina and Tonette. When these instruments have one more hole, however, you must uncover all holes on the Shepherd Pipe when their fingering indicates "T" for the thumb on the other instruments.

The way to get the purest, sweetest tones on the Shepherd Pipe is to breathe gently and evenly and not to blow hard. Hard blowing makes a shrill tone. If you blow very hard you will raise the pitch a whole octave.

You can make what is sometimes called a Double D (or double anything else for that matter) pipe by getting a longer piece of bamboo with a larger bore. This can be tuned for a lower register and can play a second voice.

It may interest you to know that there is a national Pipers Guild. The members in several communities have orchestras and there have been some splendid records made with part playing by large groups of pipers.

PLAYING THE OCARINA

Ocarinas are very popular instruments. They are made from plastic and can be bought at very low cost. When you become expert at playing simple tunes, you can open additional holes and use cross fingerings to get a wide variety of notes, but by keeping some of the holes covered at first, you can play the ocarina as easily as any of the instruments described here. The

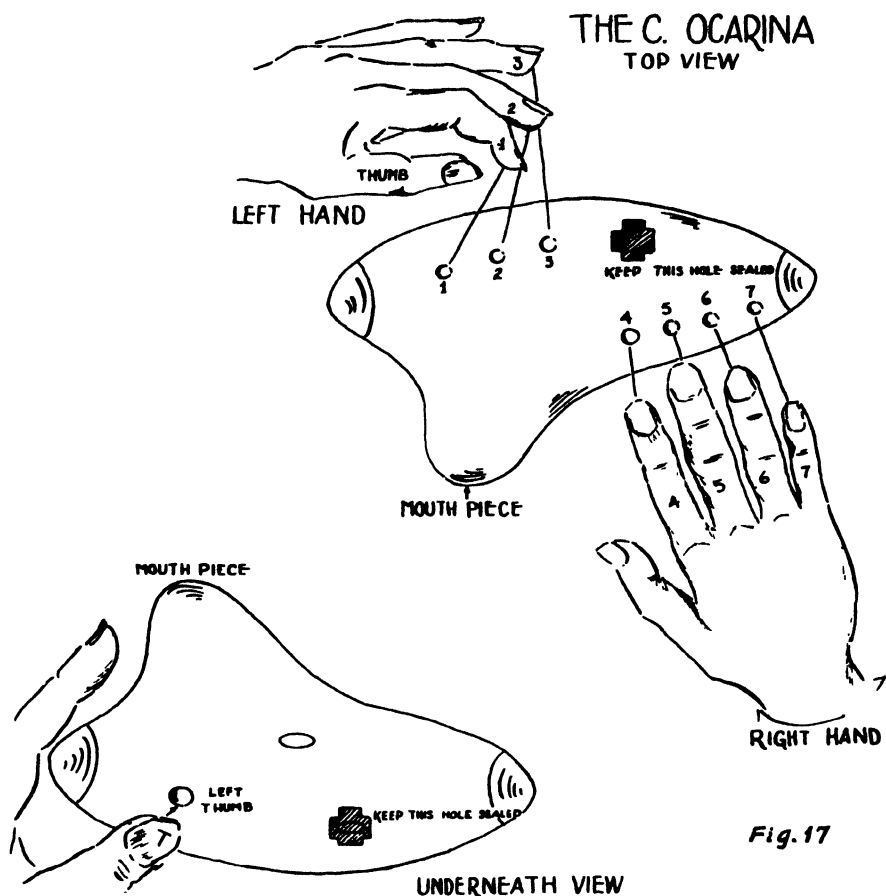


Fig. 17

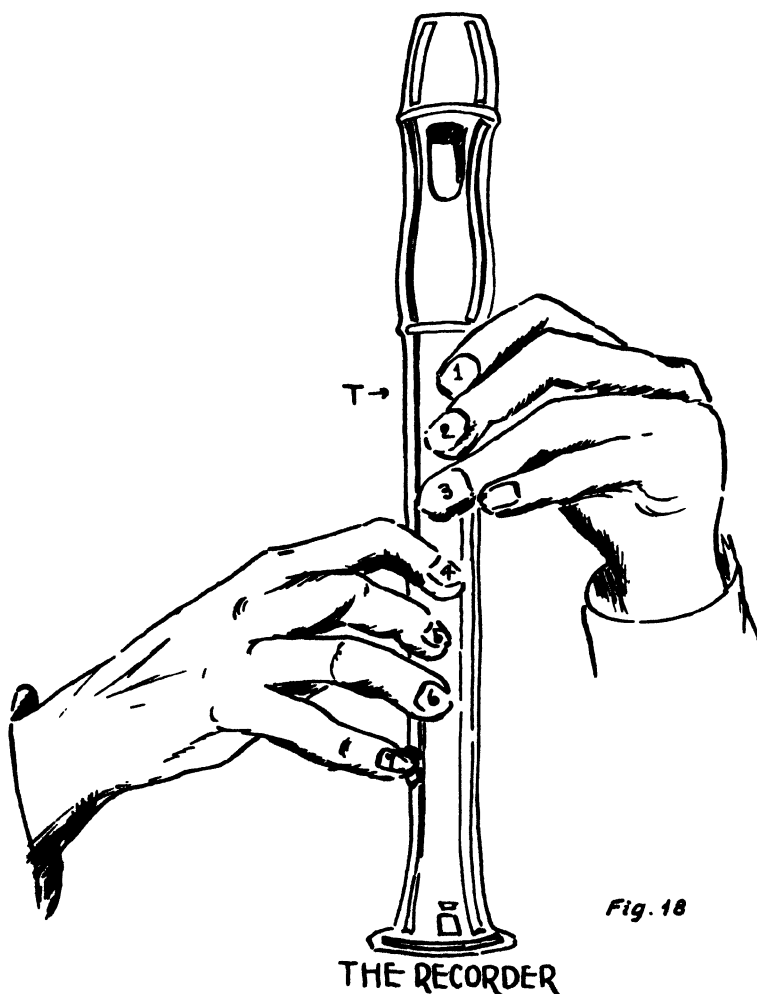
Gretsch Alto C ocarina is a convenient size for learning and comes with only the desirable number of holes opened for beginners.

Hold the instrument as shown in the illustration. "O" means all holes open. Balance the instrument by resting the left little finger on the uncut hole on the top of the instrument, and the right little finger on the tip of the instrument. "T" means only the left thumb hole covered. "1" means thumb and one finger, "2" means thumb and two fingers, etc.

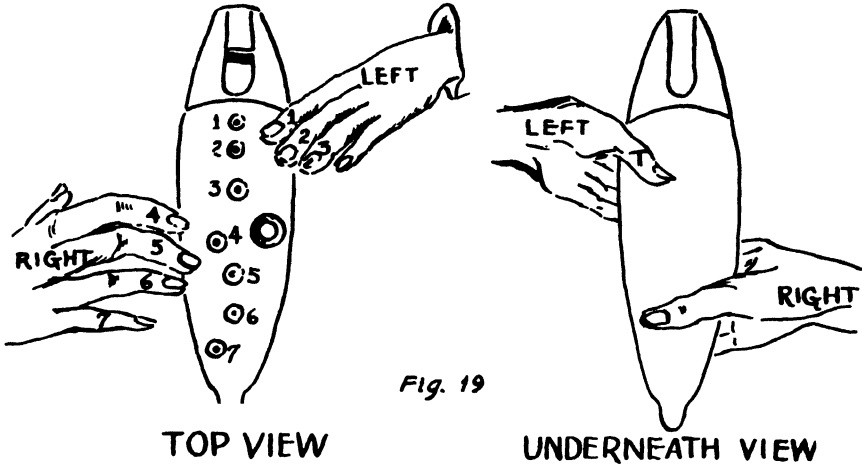
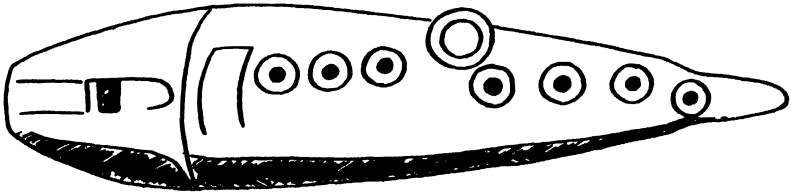
Try playing the four pieces given for the Shepherd Pipe. They are fingered the same on the ocarina. Remember, however, to keep the thumb-hole covered in addition to the number of fingers indicated. Make a separate motion of the tongue for each note, as though you were saying too-too-too. Blow a little harder for the notes that have fewer holes covered.

PLAYING THE RECORDER

The recorder is very similar to the Shepherd Pipe. Most recorders have eight holes, so you call the left thumb T, and then number the other holes 1, 2, 3, 4, 5, 6, and 7, as indicated in the illustration. Remember that on the recorder "1" means the thumb and one finger, "2" means the thumb and two fingers, etc. Recorders can be bought at music and department stores where they have toy or music departments. Try the tunes numbered for the pipe on the recorder, remembering the slight difference noted above.



THE TONETTE



PLAYING THE TONETTE

The tonette is fingered like the ocarina, but shaped differently. Notice the picture and follow the same general directions as for the ocarina.

The following pieces for ocarina or tonette are all taken from the Gretsches "Easy Play Ocarina Chart" and are used here by permission.

GOOD NIGHT, LADIES

1	3	6	3	1	3	2	2
Good	night	la-	dies,	Good	night	la-	dies!
1	3	T	T	T	1	1	2 2 3
Good	night	la-	dies,	We're	going	to	leave you now.
1	2 3	2	1 1 1	2	2 2	1	0 0
Mer-	ri-ly	we	roll a-	long,	roll	a-	long, roll a-
1	2 3	2	1 1 1	2	2 1	2	3
Mer-	ri-ly	we	roll a-	long,	O'er	the	dark blue sea.

OLD BLACK JOE

7 5 4 3 3 3 2 T 1 2 3
Gone are the days when my heart was young and gay,

7 5 4 3 3 3 2 3 4 5 6
Gone are my friends from the cot- ton fields a- way;

7 5 4 3 3 3 2 t 1 2 3
Gone from the earth, to a bet- ter land I know,

T 1 T O-1 T 2 3 2 5 6 7
I hear their gentle voi- ces call-ing Old Black Joe.

3 5 3 3 5 3 3 3 2 T 1 2 3
I'm com- ing I'm com- ing, for my head is bend- ing low,

T 1 T o-1 T 2 3 2 5 6 7
I hear their gentle voi- ces call-ing Old Black Joe.

AULD LANG SYNE

7 4 5 4 2 3 4 3 2 4 4
Should auld ac- quaint-ance be for- got, and nev- er

2 T O
brought to mind?

O T 2 2 4 3 4 3 2 4 6
Should auld ac- quaint- ance be for- got, and days of

6 7 4
Auld Lang Syne?

O T-4 4-2 3 4 3 O T-2 2-T O
For Auld Lang Syne, my dear, for Auld Lang Syne,

O T 2 2 4 3 4 3 2
We'll take a cup of kind- ness yet, for

4-5 6-7 4
Auld Lang Syne.

REUBEN AND RACHEL

7 7 7 7 7 2 3 7 7 7 7
 Reu-ben, Reu-ben, I've been thinking, What a grand world

7 2 3
 This would be,

T T 1 3 2 2 3 5 7 6 6
 If the men were all trans-ported, Far be-yond the

2 1 T
 Nor-thern Sea.

WAY DOWN UPON THE SWANEE RIVER

5 6 7 5 6 7 T 2 T 3 5 7 6
 Way down up-on the Swan-ee River, Far, far a-way,

5 6 7 5 6 7 T 2 T 3 5 7
 There's where my heart is turn-ing ev-er, There's where the
 6 6 7

old folks stay. (Repeat tune)

1 T O 3 3 2 3 T T 2 4 2 3
 All the world is sad and drear-y, Ev-ery-where I roam,

5 6 7 5 6 7 T 2 T 3 5 7 6
 O, darkies, how my heart grows wear-ry, Far from the old

6 7 7
 folks at home.

ROW, ROW, ROW

7 7 7 6 5 5 6 5 4 3
 Row, row, row your boat, gently down the stream,

T T T 3 3 3 5 5 5 7 7 7 3 4 4 6 7
 Mer-ri-ly, mer-ri-ly, mer-ri-ly, mer-ri-ly, life is but a dream.

If you have several players, try some rounds with the various instruments we have been describing. (Remember that on the Shepherd Pipe you uncover all holes for "T.") Here is "The Quail" fingered for ocarina, pipes, etc.

THE QUAIL

3	3	2	3	4	5	3	3	3
O,	hear	the	bird	in	the	mea-	dow	sing,
5	5	4.	5	6	7	5	5	5
His	voice	sounds	clear	in	the	ear-	ly	spring,
3	3	T	3	3	T	3	3	T
Bob-	White,	Bob-	White,	Bob-	White!			

PLAYING THE PIANO

If you have never learned to play the piano but would like to be able to "tinkle" a little and to produce a few tunes, you can easily do it. We haven't space to go into much detail here but we will give you a start. If you want to go farther, get a copy of "The Adult Explorer at the Piano" (see Bibliography.)

It shows how to read music and tells how to play melodies and chords.

Find C on the piano, to the left of two black keys, and then play C, D, E, F, G.



Fig. 20

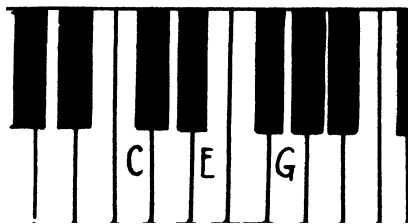
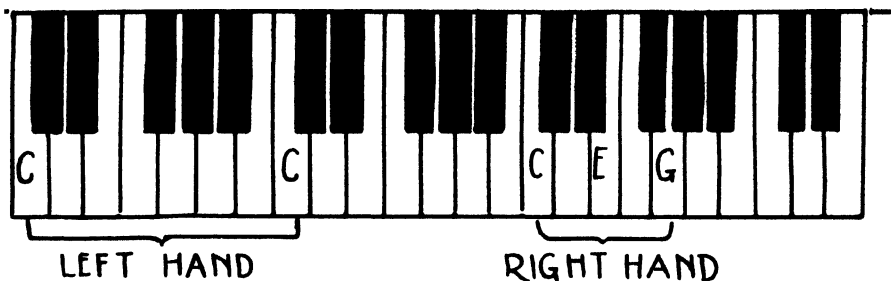


Fig. 21



Numbering the fingers as shown above, keep one finger over each key while you play the following numbers and sing the songs:

3 3 3 4 4 5-4 3 2-3
 Drink to me only with thine eyes,
 4 5-1 4 3 2 1
 And I will pledge with mine.
 3 3 3 4 4 5-4 3 2-3
 Or leave a kiss within the cup
 4 5-1 4 3 2 1
 And I'll not ask for wine.

Now find C, D, E, F, G with the left hand lower down on the piano and play this same tune with the left hand.

Here is another tune. Try it first with the right hand and then with the left:

3 3 3 3 3 3 3 5 1 2 3
 Jingle bells, jingle bells, jingle all the way!
 4 4 4 4 4 3 3 3 3 2 2 3 2
 O! What fun it is to ride, In a one-horse open sleigh!
 3 3 3 3 3 3 3 5 1 2 3
 Jingle bells, Jingle bells, Jingle all the way,
 4 4 4 4 4 3 3 3 3 5 5 4 2 1
 Oh, what fun it is to ride, In a one-horse o- pen sleigh!

When you know this in the right hand, try it in the left.

Now place the right hand in the C-D-E-F-G position and play every other note: C, E, G. (Fig. 21.)

Play these three notes together to make a chord. Repeat this chord over and over while you sing (start singing on C):

Row, row, row your boat
 Gently down the stream,
 Merrily, merrily, merrily, merrily,
 Life is but a dream.

You can vamp a more interesting accompaniment by playing two C's in the left hand and the chord in the right. (Fig. 22.)

Play first the left hand C's and then the right hand chord while you sing:

○	chord	○	chord
Row,	row,	row	your boat
○	chord	○	chord
Gently	down	the	stream,
○	chord	○	chord
Merrily,	merrily,	merrily,	merrily,
○	chord	○	chord
Life	is	but	a dream.

This chord will serve to accompany many well known rounds. For example:

○	chord	○	chord
Frere	Jacques,	Frere	Jacques,
○	chord	○	chord
Dormez -	vous,	Dormez -	vous?
○	chord	○	chord
Sonnez	les matines,	sonnez	les matines,
○	chord	○	chord
Ding,	Ding,	Dong,	Ding, Ding Dong.

The chord you have been playing is called the ONE chord in the key of C. Now try a new one. After playing the ONE chord, C-E-G, in the right hand, let the thumb move down to the next lower note (B), change the

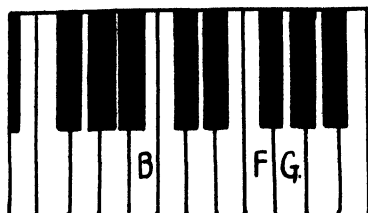


Fig. 23

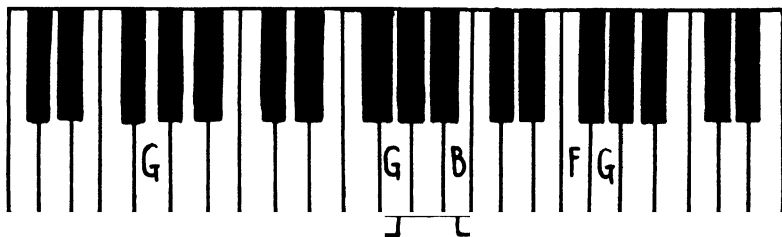
middle note from E to the next higher, F, and keep the top note the same, G. (Fig. 23.)

This new chord is called the FIVE chord. Make up a waltz by playing the FIVE chord three times and the ONE chord three times, repeating over and over. After this is well started, you can sing:

(We will use V for the FIVE chord and I for the ONE chord)

V V V I I I V V V I I
 O, the more we get together, to-gether, to-ge-ther,
 I V V V I I I V V V I I
 O, the more we get to-ge-ther, the happier we'll be.
 I V V V I I I V V V I I
 For your friends are my friends, and my friends are your friends,
 I V V V I I I V V V I
 So the more we get to-ge-ther, the happier we'll be.

Now try a bass with this new chord. Just as C made a bass for the I chord, G will be the bass for the V chord. (Fig. 24.)



LEFT HAND

RIGHT HAND

Fig. 24

Now your waltz will be C, I chord, I chord, G. V chord, V chord, C, I chord, I chord, G, V chord, V chord, etc. (Left, right, right, left, right right.)

GV V C I I G V V C I
 O, the more we get to-ge-ther, to-ge-ther, to-ge-ther,
 I GV V C L L G V V C I
 O, the more we get to-ge-ther, the hap-pier we'll be.
 I G V V C I I G V V C I
 For your friends are my friends, and my friends are your friends,
 I G V V C L L G V V C I
 So the more we get to-ge-ther, the hap-pier we'll be.

The following piece calls for a different arrangement of the same chords:

C I I C I I C I I G V
 In a ta-vern, by a ca-vern, ex-ca-va-ting for a mine,
 V G V V C I I G V V C I I
 Dwelt a mi-ner, forty - ni-ner, and his daugh-ter Cle-mentine.
 C I I C I I C I I G V
 O, my darling, O my darlin, O my darling Clementine,
 G V V C I G V V C I I
 Now she's lost and gone for-e-ver, Dre' ful sor-ry, Clementine.

Several other pieces that can be accompanied with these chords are "Long, Long Ago," "Good-bye, My Lover, Good-bye," and "Don't Sit Under the Apple Tree." Since these are not waltzes, you play left, right, left, right, left, right, with just one chord to each left-hand note.

Now go back to the very beginning of your piano playing and try everything in a new key. Your ear will tell you which black keys to use. For instance, if you start on D, you will have:

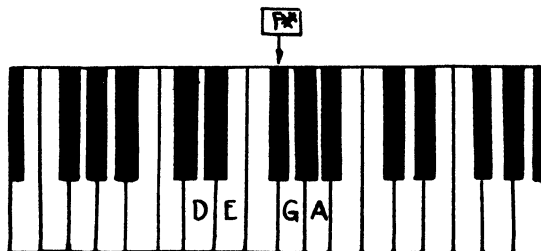


Fig. 25

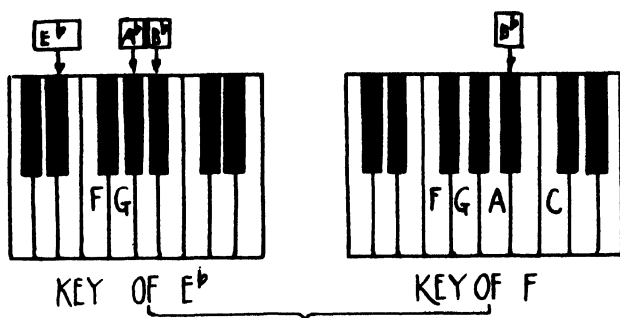


Fig. 26

This key will be good for accompanying the Shepherd Pipe in the key of D. You can play "Drink To Me Only With Thine Eyes," and "Jingle Bells" in this way by using the same fingers as before. When you come to the chords remember that the I chord uses every other note, and that you find the V chord by moving the lowest tone down to the nearest key (black or white), the middle note by moving up to the nearest black or white key, and keeping the top tone the same. After playing chords in this new key, try several others.

LISTENING TO MUSIC

You will find that the pleasure of listening to music will be greatly enhanced by singing or playing a little yourself, if only in the simple ways we have described. This will be true not only for "fireside" music (one of the most enjoyable kinds) but for formal concerts and operas as well. We really need both kinds of music—intimate, personal music among friends and kinsfolk, and concert music of high technical perfection by artists who are making music their life work. There is, of course, another wonderful kind of musical entertainment always at our command—arm-chair concert-going by means of radio and phonograph records, which provide us with practically unlimited opportunity to hear all kinds of music and to practise "listening" as a fine art if we care to.

For the sake of those who have heretofore listened only casually and

who might like to understand a few of the formal aspects of music in order to increase their enjoyment, we will consider briefly a few points.

PURE SENSUOUS BEAUTY

It is not necessary to make a highly intellectual response to every piece of music you hear. Sometimes you can have the greatest enjoyment from sitting back and letting the sheer beauty of the music give you a pleasant feeling without trying to analyse either the music or your emotions. The outline of the melody, the quality of the instruments or the voice, the beauty of tone growing louder and softer, the soothing effect of shifting harmonies, any or all of these things may appeal to you. Later, perhaps, you will want to think about certain characteristics which caught your attention.

PROGRAMME MUSIC

If music has been written with a particular programme or story in mind, it is nice to know what it is, or to make up your own programme.

For example, you may be listening to the "Andante" movement from Haydn's "Surprise Symphony" (Victor M-55, Koussevitsky.) The music is entirely self-sufficient, but you may find it interesting to know something of the story. Haydn's orchestra played regularly for a group of men and women who for social reasons had to sit through evenings of music which were longer than their individual tastes would have dictated. If the music was soft and soothing, some of the older listeners would fall asleep. Haydn deliberately wrote this movement with just enough very soft music to let the old folks have their nap, and then provided a loud chord to wake them up with a surprise, whereupon they would send startled guilty looks in the direction of their fashionable host, to see whether he had noticed their inattention.

Debussy's "Golliwog's Cake Walk" (Columbia 17088-D, 68962-D, Gieseking) is another example of a piece with an interesting programme. The fascinating rhythm and melody will entertain you even if you know nothing of its origin, but if you hear it several times you will begin to find a story in it. Debussy was very much interested in American Jazz and in the dancing of American negroes, which he often observed in Paris cabarets. Golliwog is a negro doll or puppet who has enrolled for the cake-walk, a dance contest where the most eccentric dancer wins the prize of a cake.

As he prances around in the antics of his dance, he suddenly spies a beautiful maiden, and the music becomes amorous. His passionate expression of love alternates with backward steps in cake-walk rhythm until he decides that he is only a Golliwog after all and that he had better return to his dance and win the prize. If you want to analyse the music still further you may note that the cake-walk tune bears a similarity to an American song called "Georgia Camp Meeting," and that the love scene uses a burlesqued version of the famous love theme from Wagner's "Tristan and Isolde."

HISTORICAL SIGNIFICANCE

You may derive pleasure from knowing something of the history of music you are hearing. This knowledge may take the form of an historical anecdote such as the story of Haydn and the Surprise Symphony, or it may be a mere general acquaintance with the styles of different periods in the history of music. We can make a very rough classification of musical eras by referring to classical, romantic, and modern music. As you hear more and more music you will discover many subdivisions of these three periods, and many exceptions to any principles we can establish as characteristic of each period.

If you listen to a Bach fugue such as the Fugue in C minor from Book I of the Well-Tempered Clavichord (Victor 9124, Samuel) you will be impressed with the formal beauty of the design. The music speaks for itself without any effort to tell a story and without obvious emotional significance. You have this same feeling of pure music for its own sake when you hear a Mozart sonata such as the Sonata in C (Timely 1314, anonymous) which has had the flattery of recent imitation under the title "In an Eighteenth Century Drawing-room." This idea of the classical beauty of pure musical design pervades the works of Bach, Handel, Haydn, Mozart, and the early Beethoven.

As Beethoven developed, he began to pour more emotional significance into the classical forms and when you hear his "Eroica" Symphony (Columbia M-285, Weingartner) you can, if you wish, read into it the whole story of the life and death of a hero. A Chopin nocturne such as the famous one in E flat (Victor 7416, Paderewski) is a love story. MacDowell's "Indian Suite" (Columbia M-373, Barlow) gives you a series of pictures, and Schumann's "Carnaval" (Victor M-70, Rachmaninoff) tells a number of short stories in music. Other romantic composers include Brahms, Schubert, Liszt, Strauss, Saint-Saens, Mendelssohn and Wagner. Although you may

enjoy romantic music by trying to see some emotional content, or a picture or a story in it, we must remember that music goes beyond any mere story. As has been said, "Music is the expression of the otherwise inexpressible." Many romantic composers have granted that their music was an emotional expression, but insisted that it is "pure music" without any definite story. Perhaps the safest way to listen is to enjoy the music for itself, and then imagine a programme if the music suggests one to you.

Some modern composers seem to have returned to the classical idea of music as pure design, while others have retained the emotional expression, and even the pictorial and narrative aspects of the romantics. A common characteristic of most moderns is the use of new methods, including novel rhythms, unusual melodies, and dissonances. Some modern pieces sound like mere noise at first, but when you hear them often enough you discover that the composer has just found new ways of expressing himself in music. Listen to the Prokofieff Classical Symphony (Victor 7196-7, Koussevitsky) for pure musical design with modern harmonies. You will find plenty of emotional content in Scriabin's "Poem of Ecstasy" (Victor M-125, Stokowski), and a series of pictures in Debussy's "La Mer" (The Sea) (Victor M-643, Koussevitsky.) Stravinsky uses modern music to tell an exciting story in his "Firebird Suite" (Victor M-291, Stokowski.) Interesting modern American compositions which tell a story at the piano are Copland's "Scherzo Humoristique, The Cat and the Mouse" (Victor 15861, Sanroma), and Harris' "Children's Suite—Bells, Sad Children, Happy Children, Slumber" (Victor 13446, Johanna Harris). Some of the other modern composers well worth knowing are Sibelius, Respighi, Satia, Rebikov, Pinto, Krenek, Palmgren, Shostakovich, Honegger, and the following talented Americans: Ernest Bloch, Percy Grainger, Charles Griffes, David Guion, Howard Hanson, William Schumann, and Leo Sowerby.

We have already indicated that the distinctions among these three great schools of music—classical, romantic, and modern—are not always clear cut and that there are many different sub-divisions within each period. Nevertheless it is helpful to know something about the kind of music, generally speaking, written at different times. If you do not know the name of a piece you are hearing, it is fun to guess whether it is classic, romantic, or modern. When you really become good at listening, you will often be able to guess the exact composers.

FORM RECOGNITION

Many listeners enjoy noticing how a piece of music is put together. Next to one simple tune by itself, the simplest form you can have is the "Two-Part" form. It is just two short pieces put together. "America" is in two-part form. "My country tis of thee, Sweet land of liberty, Of thee I sing," comes to a complete close before you start the next part. If you use a different letter for each part, the two part form is AB. Popular songs with verse and chorus are in this form, and many of the numbers in the French Suites and English Suites of Bach follow it.

The three-part form has the first tune coming in again after the second—ABA. Since this gives both unity and variety, it is quite a favourite form. "The Ash Grove," "For He's a Jolly Good Fellow," "Au Clair de la Lune," and "Swanee River" are all three-part forms. You can recognize the end of Part One, because there is always a feeling that the music could stop there. Part Two usually runs right into Part Three, but you can recognize the beginning of Part Three because it sounds like the beginning of Part One. Sometimes the last two parts will be shorter than the first one, as in the last three pieces mentioned.

A nine-part form is made up of two three-part forms put together with the first one repeated at the end—ABA-CDC-ABA. The middle part, CDC, is called the trio, and the whole form is often called three-part form with trio. Dvorak's "Humoresque," and Chopin's "Funeral March" (Columbia M-378, Kilenyi) are both in this form. The minuet or scherzo movement of a sonata or symphony is usually in this form.

Another favourite form is the Rondo, which has the first theme return after each new tune. There are many types of rondos. ABACA is a very simple one. ABACABA is another common version. Beethoven's amusing Rondo a capriccio, "Fury Over a Lost Penny," (Victor 15407) is a good one. Often the last movement of a symphony or a sonata is a rondo, and you can always tell, because it is so labelled in the name of the movement. It is interesting to watch the form of a rondo while it is being played. All you have to do is to notice the first theme at the beginning of the piece, and listen for its return after each new section.

A theme with variations, as the name implies, has the same theme repeated over and over with different effects each time. Sometimes the theme will be in a low voice, sometimes higher up. One variation may be fast, another slow; one sad, another gay. The accompaniment will change its style from

one variation to another. Extra notes will be added to embellish the theme. Listen to the famous Thirty-Two Variations in C minor by Beethoven (Victor 1689-90, Horowitz). Try to memorise the theme when it is first played, and then watch it during the thirty-two modified repetitions.

A Fugue is an elaborate form which can be reduced to one simple element, the constant recurrence of the fugue subject. It is easy to recognise because the subject appears all by itself at the very beginning, and then is introduced by each voice in turn. The composition, performance, or appreciation of a fugue is usually considered quite an intellectual feat, but if you will just try following the fugue subject every time it recurs, you can enjoy the intellectual design quite easily. Besides studying the Bach Fugue in C minor mentioned earlier, listen to his Chromatic Fantasy and Fugue (Victor 8680-1, Fischer). A modern treatment of the fugue form is found in the Polka and Fugue from Weinberger's "Schwanda" (Victor 7958, Ormandy.) After the jolly dance tune introduced in the polka rhythm (it has the same swing as the "Beer Barrel Polka" or the "Pennsylvania Polka") the fugue starts with its own fugue subject. Towards the end of the fugue the polka and fugue tunes are played simultaneously and many secondary melodies can be heard through the dissonance.

THEME RECOGNITION

Just as one likes to see old friends, so one enjoys hearing familiar pieces of music. You cannot always remember an entire piece you have heard, but if you can recognise the theme or themes used, you have found a friend. Knowing the themes also helps you to follow the form. "Symphony Themes" (N. Y. Simon and Schuster. 1942) is a book designed to help people enjoy symphonies by keeping the important themes before them during the playing of the music.

NATIONAL FLAVOUR

It is also interesting to recognise national characteristics in compositions. The works of Sibelius, such as Finlandia (Columbia 11178-D, Rodzinski) have a strong national flavour, and the Tschaikowsky symphonies sound definitely Russian. Vaughan Williams "London Symphony" (Decca 25618-22, Wood) suggests his native England. Many feel that there is something

suggestive of our own country in the symphonies of Harris and Hanson. (Harris No. 3, Victor M-651, Koussevitsky), (Hanson No. 2, Victor M-648, Hanson.)

You probably can identify a number of national types even if you have never consciously tried to place them. If you have companions interested in learning to be good listeners, give one another a quiz occasionally and see what kind of score you can make.

THE SYMPHONY

Many people think of a symphony as a difficult form of music, but it is not so when you know the symphony scheme. All that has been said about pure sensuous beauty, historical significance, form recognition, theme recognition, and national flavour, applies to the enjoyment of symphonic music as much as to that of voice, piano, or other individual instruments. In addition there is the pleasure of recognising the different instruments and groups of instruments. In the illustration (Fig. 27) you see examples of typical instruments from each of the four main divisions of the orchestra.

The violin represents the string section, which is so important to the symphony. Listen to the violin alone as Menuhin plays the Sarabande from the Bach "Partita in B minor" for violin alone (Victor M-487) and then hear two violins with the larger stringed instruments, viola and 'cello, in Mozart's "Quartet in D major" (Victor M-222, Budapest Quartet) or any good string quartet. Then listen to the Haydn "Surprise Symphony" previously mentioned to hear how the strings carry most of the burden in a complete symphony.

The clarinet typifies the wood-wind section which will seem close to you if you have tried the Shepherd Pipe, recorder, tonette, and ocarina. Brahms' "Clarinet and Piano Sonata in E flat" (Decca 25722-4, Leroy and Pasquier Trio) and the Mozart Quartet for Oboe and Strings (Columbia x-21, Goossens, Lener, Roth, Hartmann) show typical wood wind instruments.

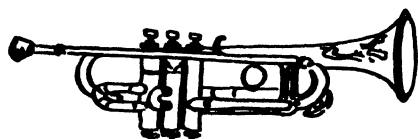
The trumpet and the entire brass wind family is known to everyone who has heard a bugle call or listened to the "Carnival of Venice."

The percussion section is easily recognised. Not everyone knows, however, that the Kettle Drums actually are tuned to different pitches.

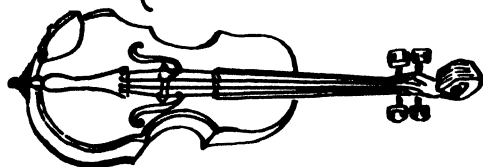
Listen to a symphony and try to distinguish the four divisions of the orchestra. Then if you can tell the exact instrument or instruments playing,

INSTRUMENTS ~

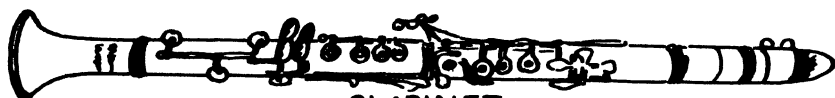
FOUR FAMILIES



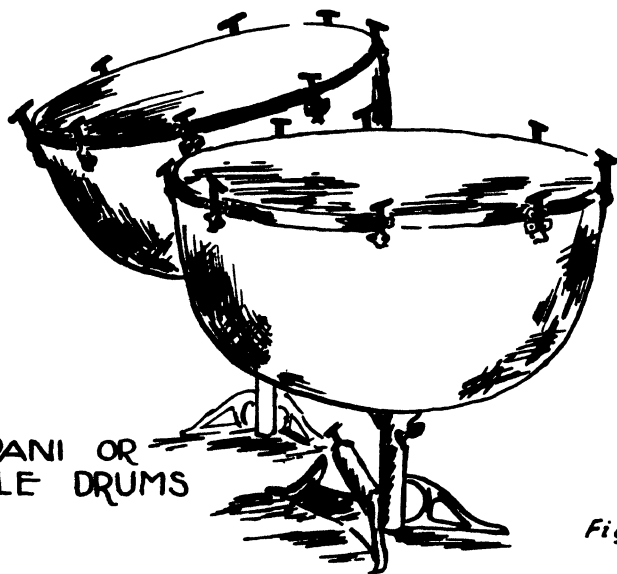
TRUMPET



VIOLIN



CLARINET



TYMPANI OR
KETTLE DRUMS

you are really good. In "Symphony Themes" the authors have indicated which instrument or which section of the orchestra introduces each theme.

A symphony usually contains four movements: the first movement, frequently preceded by a slow introduction, is normally in the allegro-sonata form. This form is based on two important themes. We can best describe it by comparing it to a three-act play. Act One is the Exposition, which introduces the hero (Theme I), and after having him wander around the stage and sometimes talk to minor characters (episodês), arrives in a new key to introduce the heroine (Theme II) who in turn wanders around and possibly talks to minor characters until the curtain falls on Act One.

Act Two is the Development, where any of the characters introduced may occur in any key and form. It runs without a break into Act Three or the Recapitulation, which duplicates the material of the Exposition except that the heroine (Theme II) has now married the hero, so she sings in his same key, and the piece ends in the same key in which it started.

The second movement is usually slow and has no required form. It may be like the first movement in form. It may be a three-part form, a theme with variations, or some other form. The third movement is normally a minuet or scherzo, and it follows the nine-part form we have described as three-part with trio. The last movement is usually fast and may take any form. Many symphonies use a rondo for the last movement.

When this arrangement of four movements is played by a full orchestra it is called a Symphony. The same form for piano alone, or for a solo instrument with the piano is called a Sonata. When three, four, or five instruments play this same form it is called a Trio, Quartet, or Quintet. When a solo instrument plays with orchestra it is called a Concerto. Usually a concerto has three movements, omitting the Minuet or Scherzo.

Listen to that favourite of all symphonies—Beethoven's Fifth (Victor M-640, Toscanini) and apply each of the suggestions for enjoyment. First relax and enjoy it as sheer beauty. Then listen again, thinking of it as a work by a classical writer who has entered into a romantic period, and has endowed the classical form with emotional content. Postponing a detailed study of form, try to pick out the important themes and follow them through the piece. Notice the instruments used for each part. For example, you will hear the clarinet with the strings at the very beginning, and a little later the horn introduces a vigorous theme. The second movement begins with the lower strings (viola and 'cello.)

Finally, listen to the Fifth Symphony for form. The first movement is in

allegro-sonata form, without an introduction. Theme I starts at the very beginning, and Theme II is the one announced loudly by the horn and continued softly by the violins. The slow second movement is a rondo, but the first theme is so varied each time it recurs that you will experience some of the feeling that you get in hearing a theme with variations. The third movement is in the Scherzo with Trio form, as one would expect, and the last movement is again the allegro-sonata form.

Music can be all things to all men. Whether you are singing, playing, or listening, whether you have had little or much experience with it, music is a language which has something to say to us all, and through which we can all say something.

7. FINGER PAINTING— an easy-going art

FINGER PAINTING is a light-hearted, relaxing pastime which has a way of growing on one who dallies with it. It has many interesting possibilities, but it is sheer good fun to begin with, and for a bedfast person, it is an ideal occupation.

Although you can really “make pictures” by this method—some of which you will doubtless view with pride and satisfaction—there is no long apprenticeship to serve before you acquire a technique. It is not just for those who have had preliminary art training. Indeed, if you have done any drawing or painting, forget about them for the time being, and do not try to carry over into this new medium what you have previously learned. Even though you may think that you have no talent for design or composition, if you putter with finger paints for an hour or two you will feel your imagination stirring and ideas will begin to come.

Commercial finger paints are sold in all arts and crafts shops and they can be ordered from art supply houses. But you can make your own, if you prefer, and recipes for home-made paints will be found at the end of the chapter. For adults the commercial paints will probably prove more pleasing. They come in a wide range of colours, which is an advantage if you have never learned to mix paints.

There is also a glazed paper on the market, especially prepared for Finger Painting. A beginner can use heavy wrapping paper for his first essays in this gay and happy-go-lucky art.



Fig. 1 FINGER PAINTING

Courtesy Universal School of Handicrafts, New York City.

You will need a smooth, hard surface to work on—a table, or a tray or board if you are in bed.

The paints are soluble in water and however much you splash them about they will do no permanent damage, unless you are using a polished table for a working surface, in which case, cover it with oilcloth. If you are going to work in bed, roll up your sleeves and wear an apron or towel to protect your pajamas, and have someone spread an old sheet over the bedclothes.

First, wet the paper all over with a sponge, then smooth it out on the table. Rub out all the wrinkles and air bubbles with the palm of your hand, working from the centre to the edges.

Put on several daubs of paint, according to the colour you are going to use to start with, and cover the entire surface of the paper by rubbing the colour over it with your hand. You are now ready to paint.

It is a good plan to work with only one colour at first, preferably a dark shade, so that the lines and markings will show more clearly. Work with your fingers, the ball of the thumb, the side of the palm, or even with your elbow. If you use the tips of the fingers, be careful not to scratch the surface of the paper with your nails. Do not "sit tight" while you work but let your body "go" with your hands.

You might, at first, limit yourself to manipulation, to get the feeling of how to handle your paint. Repeating one motif over and over is a good way to do this. (Fig. 1.) Study your picture when it is finished and see if it reminds you of anything. Perhaps by making a few changes here and there you might be able to find a subject or theme. If the lines run up or down, they could be worked into a clump of trees or a group of buildings. If you have a series of dots, touch them up to look like a string of beads, and then try to outline a dressing-table and a perfume bottle to make a composition.

The paints do not dry very quickly, so you can change your mind and rectify your mistakes. If you find you have made a mis-stroke, simply smooth it over and begin again. If the paint begins to dry, add a little water.

Later, when you have become adept and want to make finer lines than you can achieve with your fingers, use a pointed instrument, or a blunt needle. For a series of very small lines, try pressing a piece of frayed cloth into the paint. A comb made of cardboard is also a good tool. (Fig. 2.) With it you can make swirls and all manner of odd designs, and you can repeat them more truly than you could with your fingers, if your design calls for repetition.

After you have practised all the tricks of manipulation you can think of, it is time to try a picture. The first one may come more by luck than by tak-

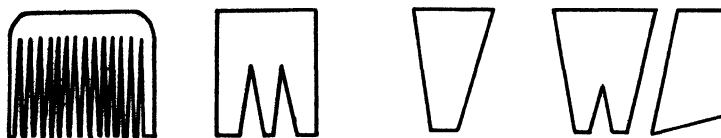


Fig. 2

ing thought. If you haven't an immediate inspiration, don't sit and ponder, just make an imprint on the paint surface with your palm, a leaf, or a spray, or perhaps a geometric object, and see what you can develop from it. Make some bold tracery with your fingers here and there at random and then try to pull them together with a central idea.

If you want to draw scenery and have perspective, to make certain objects look "near," draw the far-off things first, and gradually bring the other things toward you.

Very soon you will want to paint in more than one colour. The practice with finger paints is different than with water colours or oils. You do not mix your colours on a palette and apply them, you mix them right on your paper by putting one on top of the other. If several colours are used and repeatedly erased, they become muddy and lose their identity. The thing to do to prevent this is to cover the entire sheet with your over-all or predominant colour and "mop up" spots where the other colours are to go. A face tissue or a paper towel comes in handy for this.

Perhaps you already have a picture in mind. You cannot sketch it on the paper first and then follow the outlines. So you make your sketch on a separate piece of paper and mark out areas on your "canvas," indicating where the different colours are to go. Then refer to your sketch when drawing in the outlines of your picture.

By this time your artistic sense will have become sharpened even though you have never thought much about composition and design before. You will want to make pleasing pictures, with a sense of balance and colours that harmonise. There are a few fundamental laws of design which will help you to achieve good results in a very short time. The most important ones are these: In Finger Painting, as with more serious work, you can get three-dimensional effects, particularly where one line crosses another, or if the paint is thick. When using several colours, there will be lines of blending colours where two colours meet.

In planning your design try to make the space areas pleasing. They must be in proportion to the size of the picture you are making, neither too large nor too small.

Rhythm is an important element in design. You can get the effect of movement by repetition and by changing sizes and shapes. (Fig. 3.) For instance, if you have mountains in the background, lead up to them with foothills that become smaller in the foreground, or else graduate the size of your trees.

Proportion is another consideration. Everything in your picture should be properly related with respect to size and colour. Colours, shapes, lights and darks, must also be harmonious. Without emphasis, your picture would be dull and lifeless. There should be one main centre of interest. This can be accomplished by making the most important figure or object larger than the others or by grouping a number of smaller objects around it. By using stronger colour in the main area, emphasis is also given.

Finally, your design must have balance; all lines should give the impression of leading toward the centre of the picture rather than away from it. The weights of dark and light areas should be equal. (Fig. 4.) If you use a colour mass at one side of your picture, use the same colour at another spot in a different tone if you prefer.

Choose a form or forms with which you are familiar at first. It is better to create a design of your own from real objects than to copy pictures or designs made by somebody else. The history of design and ornament tells us that artists of consequence were always strongly influenced by the familiar natural forms surrounding them. Designs drawn from these familiar things were the ones inspiring the greatest work. (Fig. 5.)

By considering both mass and form at the same time, you will soon learn colour combinations and how to use them. A colour wheel would be helpful in learning colour relations. Perhaps you will enjoy yourself more, however, if you learn by experimenting.

There are many things you can do with Finger Painting besides making pictures and wall decorations. It can be applied to materials other than paper—wood, and beaverboard, to mention only two. Trays, coasters, bookends, and even furniture can be decorated in this way. If you do go in for Finger Painting on wood, and the wood is soft, give it a coat of clear shellac first, and then rub it smooth with steel wool or sandpaper. This will serve as a filler for the wood, and keep the paint from seeping in. Cover the design when dry with a coat of thin spar varnish. Paint the edges of the wood in an enamel of a harmonious colour. This final varnishing will also make the painting permanent. Orange shellac will give an antique effect.



Fig. 3 FINGER PAINTING

Courtesy Universal School of Handicrafts, New York City.



Fig. 4 FINGER PAINTING

Courtesy Universal School of Handicrafts, New York City.

You can make greeting cards, invitations, party favours, etc., on thin card-board. When using cardboard, wet surfaces on both sides before doing your paintings.

Glazed chintz can be painted for curtains, screen covers, etc. Since the paints are soluble, however, fabrics decorated in this way cannot be washed.

Lampshades are ideal objects for Finger Painting. Use thin bristol board or white drawing paper soaked in linseed oil. This will give a transparent effect.

Glass will take this kind of paint, so it might amuse you to decorate the mirrors in your room or some of the window-panes. Try making a "stained glass" window. Even the bottles on the side table can be touched up.

A very practical use is to make book jackets for the books you handle all the time, or perhaps for a borrowed book, to keep it fresh.

Last but not least, you can entertain your guests by inviting them to try their hands at this naïve art. You can make a good game of it by checking their first attempts with your own. Then, if you have long-ago memories in common, each of you might paint a scene and see whether the other can guess it.

When you have created a masterpiece or only a minor work, give it time to dry thoroughly, and then press it with a hot iron to keep it from curling.

RECIPES FOR FINGER PAINTS

We give below, by courtesy of the National Recreation Association, 315 Fourth Avenue, New York City, three recipes for Finger Paints. Two of them are especially for mixing small quantities; the other, however, can be reduced. You may wish to try out all of them in the course of your work.

When you have prepared your base, divide it among a number of small jars with tight lids. It will keep a long time if you remember to cover it when not in use. For pigment use powder paint art colours; for children or those who may be especially sensitive to chemical colouring substances, vegetable dyes can be substituted. These can usually be purchased at grocery stores.

The important colours to have are these: Alizarin crimson and vermilion (blue red and orange red), ultramarine and prussian blue, a good yellow—gamboge, if you have only one, a good green. You can make out with these for a start. It is advisable, however, to get a brown, as a good brown is hard to mix for amateurs. Burnt sienna and burnt umber are useful shades.



Fig. 5 FINGER PAINTING

Courtesy Universal School of Handicrafts, New York City.

Finger Paint No. 1.

Cook $\frac{1}{2}$ cup flour and 1 cup water until it bubbles. Stir continually so lumps won't form. Cool. Add 1 tablespoon of glycerine, and 1 teaspoon sodium benzoate, which is a preservative. Colour with powder art colours.

Finger Paint No. 2.

Cook $\frac{1}{2}$ cup cornstarch and 1 cup water until it bubbles. Stir constantly so lumps won't form. Colour with powder art colours.

Finger Paint No. 3.

$\frac{1}{2}$ box laundry starch ($1\frac{1}{2}$ cups)
1 quart boiling water
 $1\frac{1}{2}$ cups soap flakes
 $\frac{1}{2}$ cup talc (may be omitted)
 $\frac{1}{2}$ tablespoon of poster paint
(art colours) to each small jar of this base

Mix starch with just enough cold water to make it into a paste. Add boiling water. Cook until clear or glassy-looking. Stir continually so lumps won't form. Add talc, if available. Let mixture cool a little. Add soap flakes, stirring until evenly distributed.

This mixture can now be poured into 8 half-pint jars with tops. To each jar of mixture add $\frac{1}{2}$ tablespoon of colouring. Be sure the paint is thick and not watery. Stir thoroughly. Enough for a class of twenty.

TWO USES FOR CRAYONS

Wood Finish. Crayons are excellent for giving a final finish to wood after a project has been shaped and decorated. They will enable you to add some color to the background without covering up the natural grain of the wood. Simply apply the crayon, in any color you wish, by rubbing back and forth over the surface; or you may use many colors, one on top of the other, if you desire. It is not necessary to make the markings in a solid mass, because they will blend together when three-in-one oil is rubbed over the surface. Place a few drops of oil on a soft rag and rub over the markings very lightly until they disappear into the grain of the wood. Add more color if you like. The wax in the crayons will give



a natural luster and finish to the wood, but it is a good idea to add a coat of white shellac or paste wax to give added protection to the final finish.

Crayon Scratch-Board. You can make stunning all-over designs on paper by making a scratch board with colored crayons and poster paint. First, divide the background of paper you wish to decorate into a number of areas as in the illustration. With a wax crayon, give each area a solid coat of any color you desire (a number of colors make a more interesting design). Next, cover the whole background with a thick layer of poster paint, any color you desire, and allow to dry. The design is made by scraping off small portions of the background, thus allowing the crayon colors to show through. Use a sharp instrument to do the flaking and try to make the areas jagged rather than smooth.

8. WEAVING

IT IS SMALL WONDER that the art of weaving has always exercised such a fascination over all who have had the thrill of working at a loom, or even of looking on at someone else engaged in this absorbing handicraft. Weaving is a fundamental, like the roof that shelters us, the fire that warms us, and the food that nourishes us. Whatever one's turn of mind—romantic, utilitarian, scientific, or mercantile—he must, at this stage of man's development, wear clothes, sleep under covers and—so effete have most of us become—have his windows curtained to insure the comfort of privacy, all of which things call for recourse to woven fabrics of some sort. Old-time fiction writers of a sentimental cast used to like to speak of the warp and woof of life, and the villain would weave a spell to ensnare his guileless victim. Only basic things can get into the marrow of the language in just this way.

The early weavers of carpets, tapestries, and fine fabrics carried their work to imposing heights, never since equalled. This is both awe-inspiring and encouraging to the hand loom tyro, for even a beginner can weave useful and beautiful things, with dazzling prospects before him if he stays with his craft through apprentice and journeymen stages and becomes a master.

There are a thousand and one kinds of weaving, and that is not merely a manner of speaking. In this chapter we are going to illustrate and describe the principles and operation of the harness loom. If you learn these principles, you will be able to acquire without difficulty the higher degrees of craftsmanship.

THE FOUR-HARNESS LOOM

The four-harness loom is the one to be considered here. The ancient looms such as were a taken-for-granted article in the households of our forefathers were usually four-harness, and they allow for patterns of enough variety to be interesting without being too difficult. Figures 1 and 2 show side-front and back views of a simply constructed loom with four shafts or harnesses, and the different parts and their functions will be explained as we go on.

THE LOOM

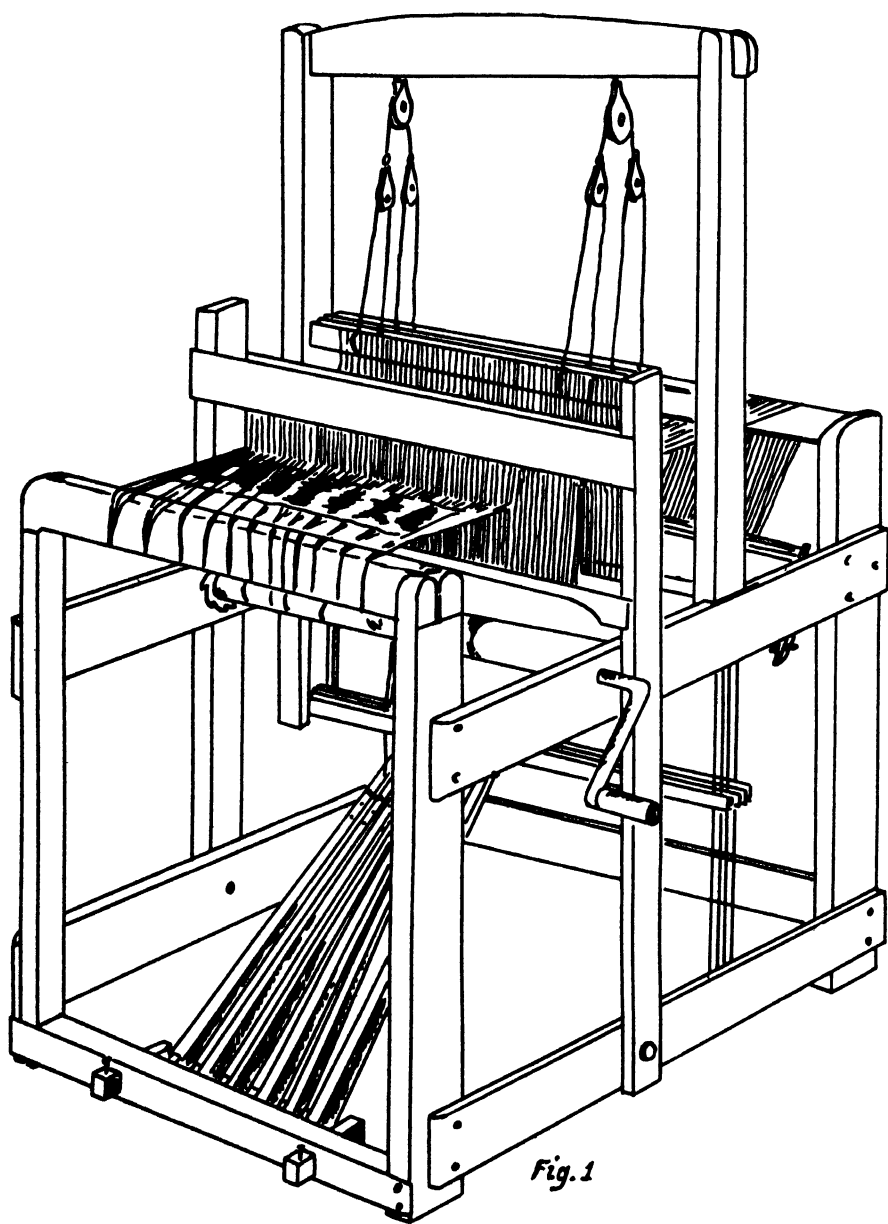


Fig. 1

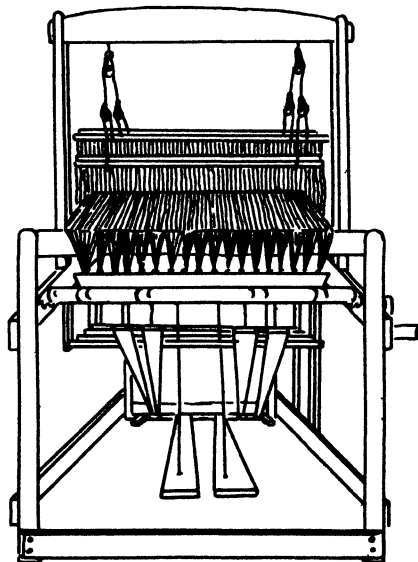
The table loom (Fig. 3) which has two harnesses (but could, of course, have more) is operated in just the same way as the floor loom, except that the latter is usually treadled with the feet.

There are many kinds of looms on the market, but whatever special features or labour-saving devices yours may have, the foundation principles and general outlines will be like the looms illustrated above.

A loom is a frame for carrying and holding taut a series of long threads called *warp* while loose threads wound on a shuttle and called *weft* or *woof* are passed backwards and forwards through them. The operation of the treadles or, it may be, a lever or another device, lifts up some of the warp threads while the others remain down, and this creates what is called a *shed*, a triangular passage-way between the warp threads. Through this the shuttle passes, making a webbing, which becomes your fabric.

There is a craft jargon of weaving as of every other pursuit. A few words you have already learned from the foregoing. Now, study the illustrations of the loom and its principal parts and learn their names.

The flat bar across the front of the loom is called the *breast beam* or *front beam*. The one across the back, the *warp beam* or the *back beam*.



BACK ROLLER
2 PEDALS UP-2 PEDALS DOWN
BACK OF LOOM

Fig. 2

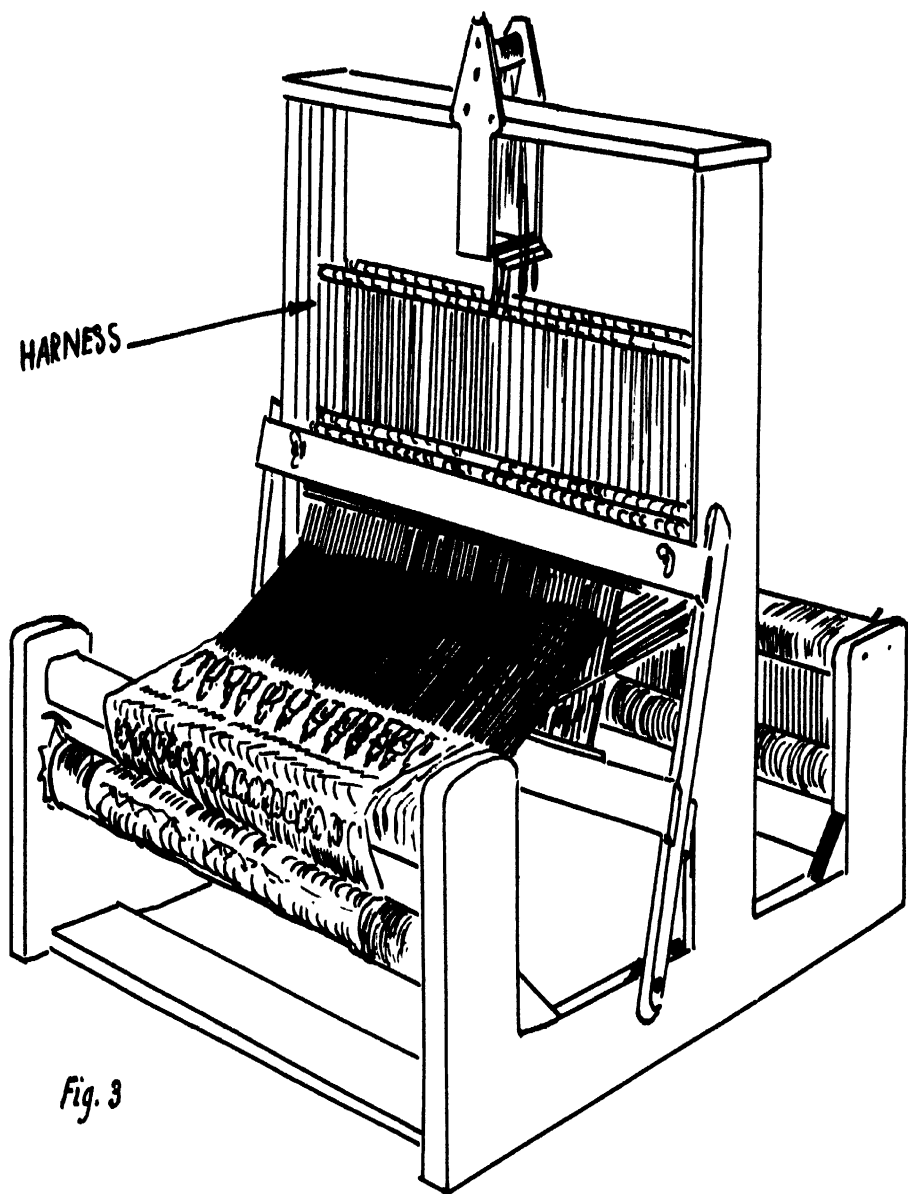
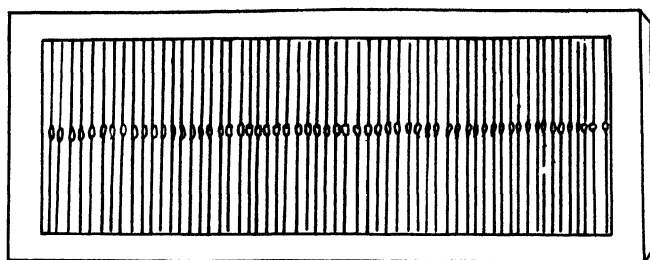


Fig. 3

TABLE LOOM



HARNESS SHOWING HEDDLES

Fig. 4

Figure 4 shows a *harness*. The harnesses are frames of wood which carry the *heddles*. The heddles are usually of metal, and you will notice the eye in the middle, through which the warp thread passes. In some of the old home-fashioned looms the heddles were made of heavy cord, waxed or varnished. It is useful to know that if you find yourself short a few heddles, or have made a mistake in your threading, you can make extra ones with string, thus often saving yourself much time and trouble. A No. 12 seine twine is a good weight cord to use for these extemporised heddles and Figures 5 and 6 will show how to get them accurate, the eyes aligned with the standard metal heddles which come with the looms.

The *treadles* are attached to the harnesses and control them. The loom illustrated in Figure 1 has six treadles, but it is still a four-harness loom. Perhaps your loom will have only four, but the use of the two extra treadles will be explained when we describe the actual weaving process. Raising two harnesses at once by depressing their corresponding treadles creates a shed.

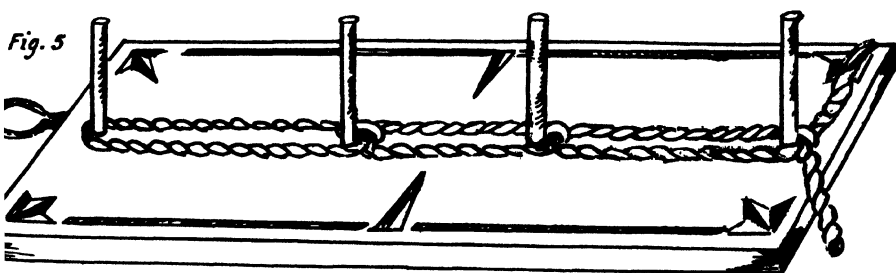


Fig. 5

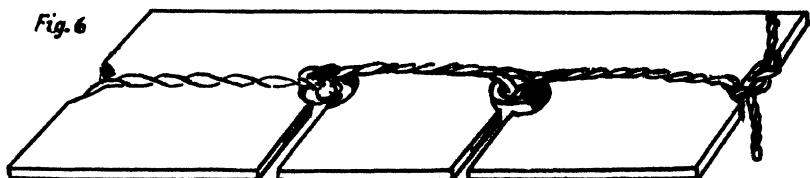


Fig. 6

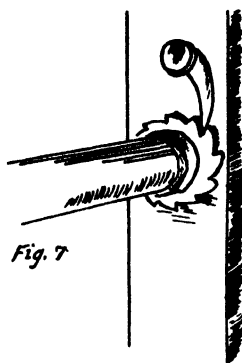


Fig. 7

The rollers, front and back, are for winding the warp and holding it taut. As you weave your cloth, it is wound onto the front roller. The rollers will have ratchets (Fig. 7) and there will be a crank or perhaps a cross-bar through the end of the roller to make winding easy. The rollers and ratchets regulate the tension of the warp, the all-important thing in turning out nice, even work. Each roller will have a cloth apron attached. There will be eyelets and tape fastened in some way to them. This will hold a flat stick to which the ends of the warp must be tied.

The *comb* or *reed* is a very important part of the loom. (Fig. 8.) It is, in most hand looms, attached at the bottom, and it moves back and forth. The metal strips have spaces between them which are called *dents*. Through these dents the warp thread passes on its way to the heddles. The reed also serves as a *beater* or *batten* for *beating* the work as you go along. The beating—lightly or strongly—is what determines whether you will get a close or a loose weave. Reeds are made to accommodate eight, ten, twelve, fifteen, etc., threads to the inch. Fifteen to the inch is a good size for general work. Sometimes, as in fine linen weaving, two or even three threads are run through every dent and from two to four dents at each end are always threaded double to make a selvedge. If you are using a thick-ply woollen warp you will need a coarser reed, but the fifteen-to-the-inch size will take two or three-ply wool and it is practical for carpet warp and the moderately fine threads.

COMB OR REED Fig. 8

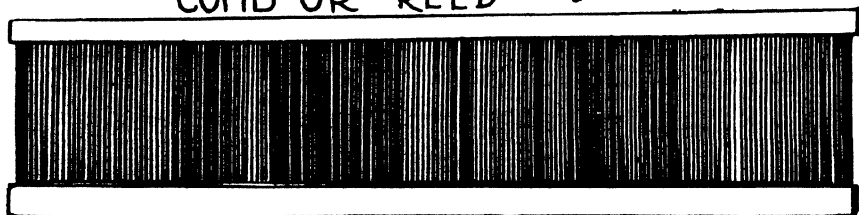
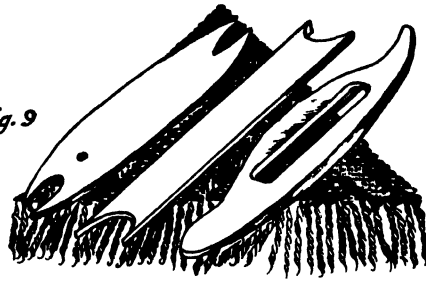


Fig. 9



Three types of shuttles are illustrated in figure 9; the one with a bobbin is called a fly shuttle. The other two are the kind you will use at first. Wind on as much weft thread as will go easily through the shed.

Some looms come from the manufacturers already set up, others are collapsible and will be delivered in parts. However, instructions for setting them up always come with them, and many manufacturers will also send books of directions and drafts of patterns. It is wise to buy a loom wide enough to make rugs or lengths of drapery, for you can make narrower widths on it, such as table runners and luncheon doilies. You will find that getting familiar with your loom and feeling at home with it does not take long.

Preparing a loom for weaving is called *dressing the loom*. Putting on the warp is called *beaming*. The first step towards this is *making the warp*.

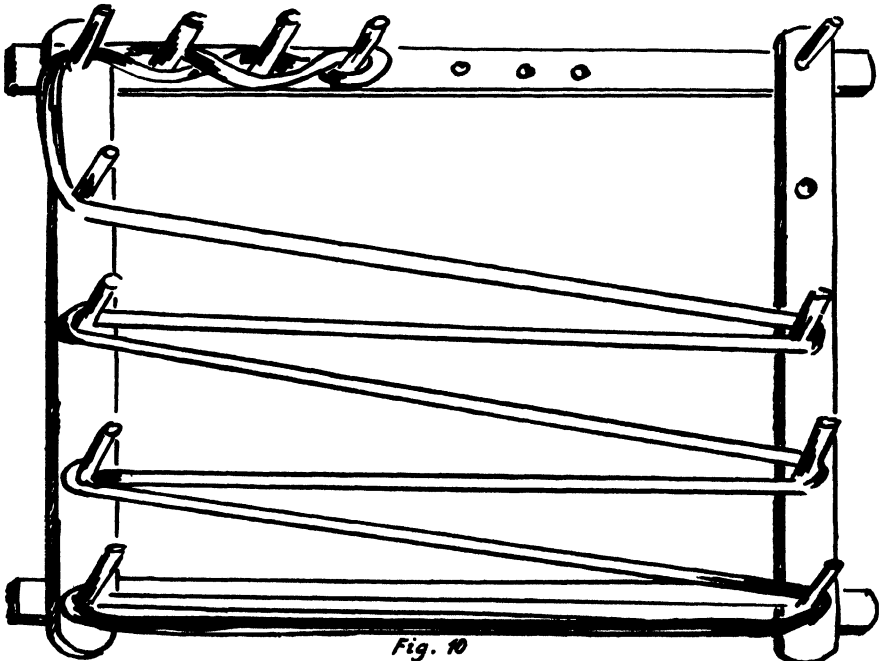
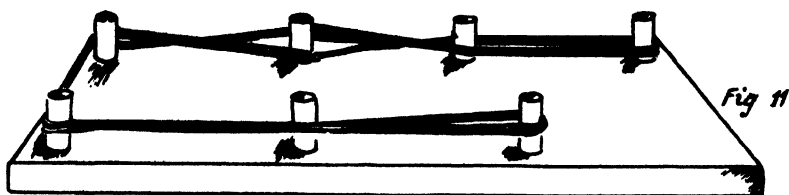


Fig. 10



There are looms which come with an attachment for making warp. If you do a great deal of weaving and use long warps, you can have them wound at some of the mills, ready to put on the loom.

However, you must know how to make a warp yourself, to qualify as a weaver.

Figure 10 shows a *warping frame* for hanging on the wall, and Figure 11 shows a table type. You can get or make them in various sizes—two and one-half, five, eight, ten, and twelve-yard lengths, and longer if you desire. Eight or ten yards is a good length warp and more economical than the shorter lengths. There must always be an allowance of about half a yard for “tying on.”

The *spool frame* (shown feeding the warping frame in Figure 12) is a great convenience. For a wide pattern calling for several hundred threads, you can put four or six spools on a frame and by tying the ends of thread together warp four at a time, thus lessening the work considerably. For example, if you require 100 warp threads and put four spools on your frame, you will have to go round it only twenty-five times instead of one hundred times.

You will see in the illustrations of the warping frames that there is a place where the threads cross in such a way as to make a definite opening. This is called the “lease” or “cross,” and it is all-important, for without it the warp would be useless. By studying Figure 13 and Figure 14 you will see why this is so. The *lease sticks*, which go through the lease, separate the threads into even sections, keeping some up and some down. The lease sticks are also called *shed sticks*, for they make the *tabby sheds*. To doubly insure that you will not lose the lease or cross in the warp, tie pieces of coloured thread through the lease, one on each side of the opening.



This is the way to "make
a warp."

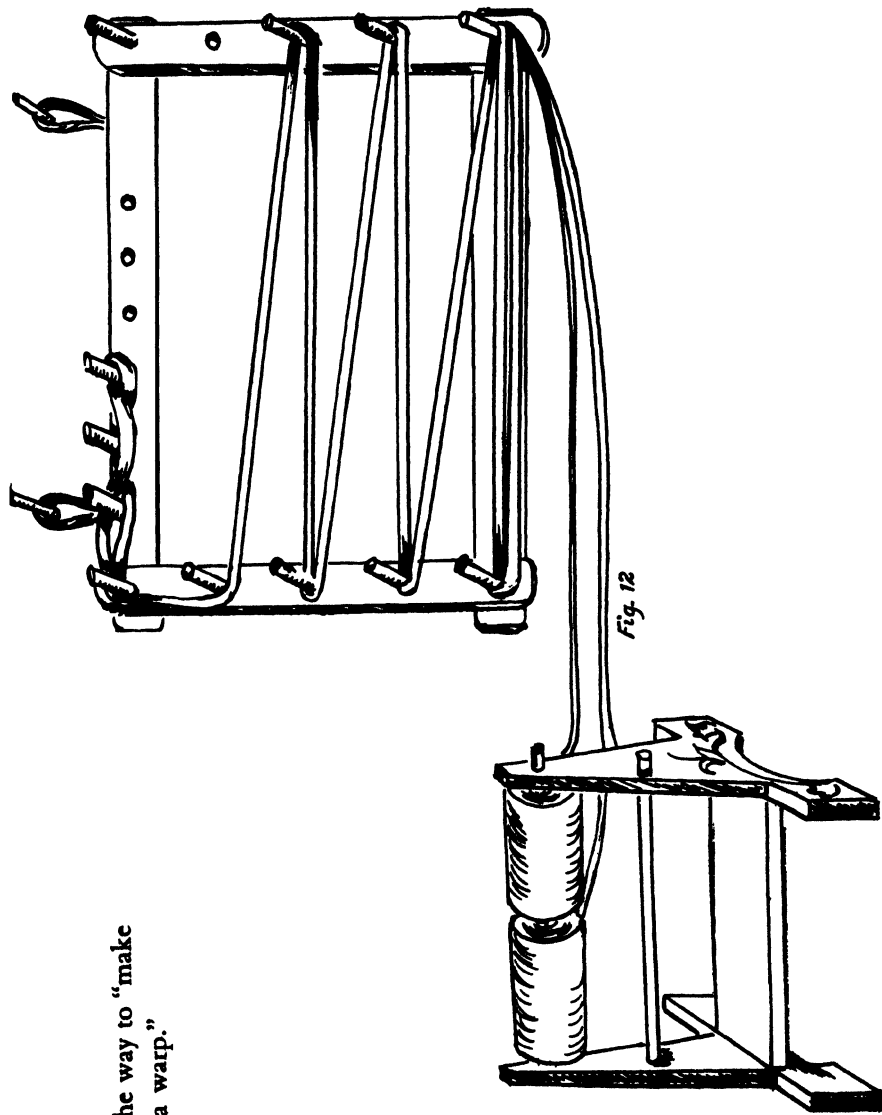


Fig. 13

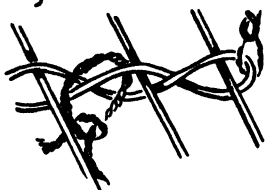


Fig. 14

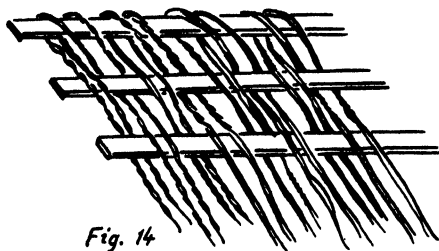


Fig. 15

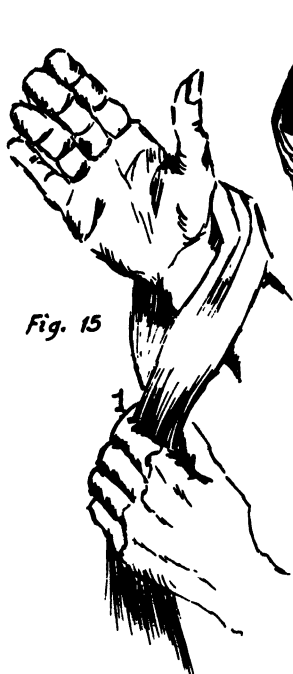


Fig. 16



Fig. 17



Now *crochet* your warp, (Figures 15, 16, and 17) as you remove it from the frame. You do exactly as you would in making a chain-stitch with a crochet needle: Make a loop, using your right hand, and pull the "bout" of warp threads through it, making another loop and so on. This is to prevent tangling. Tangled warp is the bane of a weaver's life, so handle it with greatest care. If you are going to weave a narrow strip, like a scarf, you can make your warp all in one chain, but if you are planning a wide strip with several hundred threads, you will have to make several chains.

Suppose that you are going to use three hundred warp threads. A good way to do would be to use four spools of warp. Tie the ends together. Attach it to the starting peg. Study the illustrations, according to which kind of warping frame you are going to use. It is easy to follow the route of the warp from the pictures. You will make three chains of a hundred threads each, perhaps. To do this you would have to go round your frame twenty-five times with each series of four threads. (It might be more convenient to make six chains of fifty threads, depending upon the ply of your warp.) Do not cut your warp, but tie a string at each end, as well as the two ties to mark the lease.

The next step is to fasten the warp onto the beam of your loom. This, as we mentioned before, is called *beaming*. The loom can be threaded from the front or from the back, and many experienced weavers prefer the back-to-front method. But it is easier for most beginners to understand the importance of certain points by first learning to thread from the front. After you have done this once, you can thread from the back if you like, because then you will know the what and why of every operation. In other words, when you have fully mastered the principles, small details will be a matter of individual technique.

Always warp a few extra lengths of thread, in case you lose or break one or make a mistake.

Now that you have learned about your loom and its appurtenances and the preparations for weaving, let us set up a table loom and make a woollen scarf.

This loom has only two harnesses, and so it will make only a tabby weave. The variations in your scarf, therefore, must come from colour.

Tabby is plain weaving, one thread over and one thread under, like darning, and it is the foundation of your cloth, for it serves as the binder. It is customary in the more usual types of weaving to use a shot of tabby after

every pattern shot. When you are doing pattern weaving there will be "skips" where the pattern is overshot, and without the firm tabby weaving in between these overshots your fabric would lack body.

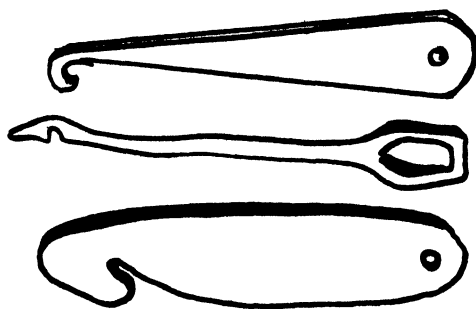
There are many ways of getting interesting effects with your two-harness weaving. You can have coloured borders, or some coloured warp threads to contrast with the predominant warp colour. Checks result from stripes of coloured warp crossed by contrasting weft. You can also have ridges by threading a number of dents double at certain intervals. We will suppose that, this first time, you have chosen white warp with maroon and aquamarine stripes at the ends. The scarf is to be two yards long and twelve inches wide. Your reed has fifteen dents to the inch. You will therefore need 180 warp threads. For this you will use a hard twisted wool, and a softer wool of slightly thicker ply, if you like, for the weft. About two-ply would be right for the warp.

Make your warp and weft wool into balls, just as for knitting, and handle it carefully, without pulling, which weakens it. Put your warp balls into a box on the floor, for the spool frame can be used only for thread which comes on tubes. Then proceed as described before to make your warp and to chain it.

Take your lease sticks and put them through the cross or lease and tie the sticks securely to the front beam of your loom. Suppose you have an eighteen-inch loom. Your scarf is to be twelve inches, so that will mean that you will begin threading your dents three inches from the right end.

Figure 18 shows three types of hooks for taking the threads through the dents and heddles, or *entering* your warp.

Fig. 18



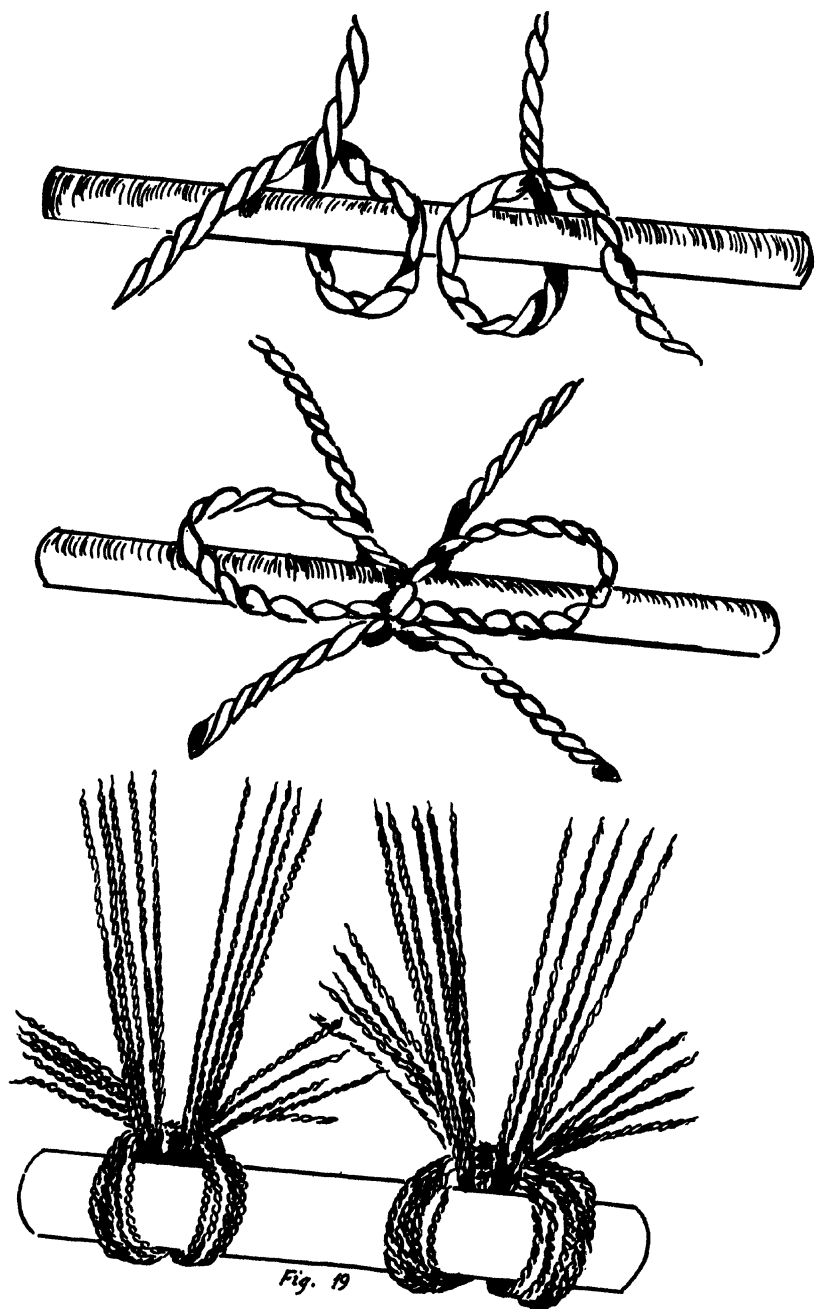
But first, when the lease sticks have been firmly tied to the front beam and the threads spread out as in Figure 14, you cut the forward ends. Leave the lease sticks in, however. Now, start passing the threads through the dents, being sure not to miss a single one, for this would spoil your whole scarf, leaving what would appear to be a drawn thread throughout the length. This can be done for the sake of design, but that will come later. You must also be careful not to cross the threads. The function of the lease and the lease sticks is to prevent this, which makes weaving impossible.

Through the first dent, three inches from the right end of your breast beam, enter two threads. Also through the next one. (You have allowed for this by measuring off 184 threads instead of 180 threads—the four extra ones for the selvedge and a few more “just in case.”) After the second dent, pass one thread through each dent until you have reached the point three inches from the left side (making sure to thread for the selvedge at this end, too.) Now, check over your work carefully, and see that you have no empty dents and no crossed threads. After your first experience in weaving, you will understand why we keep repeating certain points.

As this is to be a plain weave, or tabby, you will not need a threading draft. We will study drafts later when we come to pattern weaving. For the scarf, the procedure is to put the first two threads through the first back heddle, the next two through the first front heddle. You have now threaded for the selvedge. Continue with single threads first in a back heddle, and then in a front heddle until all your threads have been entered. It is good practice to tie the warp threads up behind the heddles in groups, so that they won't slip out. In this case, tie them in groups of fifteen (seventeen for the selvedge ends) and that will make it easy to check them. Checking dents and heddles carefully is absolutely necessary. Preparing the loom is very particular, but it is so varied that it never becomes dull. However, having to undo and do all over again is tedious and a strain on patience, so make haste slowly, and check as you go.

If you can press someone into service to help in checking and also in tying onto the back roller, it will simplify a great deal for you. You can do it all alone in a pinch, but it is easier and considerably quicker with a helper.

The warp is now ready to be tied onto the back roller. It will go over the warp beam, and the apron with the stick taped to it must be raised in the back to meet it. Over the stick and between the tapes, tie a group of warp threads. The loop knot used for this is illustrated in Figure 19. This is a crucial moment, for the tension and evenness of the warp will determine



the quality of your work. Begin tying in the middle and work from one side to the other until you reach the ends. The ends have a tendency to sag and this you must watch. You will need a length of brown paper an inch or so wider than your weaving to hold the warp threads in their proper places when you begin to roll.

There are some looms which have the back roller divided with pegs or in some other way so that the groups of warp threads will be separated. If your loom has these roller divisions you will not need the paper. Some looms are constructed to take round bobbins of warp thread. Any such variations, however, will not alter the principles and the basic procedure.

If everything is in order, you can now begin to wind your warp onto the back roller. This will entail *combing* the warp with your fingers to straighten it out as you wind. Someone must hold the warp in front and help at this stage. The warp threads must be held in two groups at equal tension, or they will not wind straight and even, as they should. The combing is done by the person in front, so that the threads will go smoothly through the heddles. When the chain ends have been wound up near to the breast beam it is time to tie the front ends to the front roller apron, exactly as you did in the back. Cut the ends carefully, now, but be sure not to lose your shed sticks. Leave them in their places. Make another check, now. If you have made a good job of it, you will not have to re-roll. If the threads in front of the heddles by the breast beam are held taut in two equal groups by a helper while the warp is being wound slowly and carefully onto the back roller, all should be well, and you can get your proper tension by the use of the ratchets. Then you can start weaving. A good way to test the tension is to brush your hand lightly over the taut warp and if there is just a tiny "give" and it goes right back, it is at correct tension. Be sure that the ends are as tight as the middle, or you will have a poor, wavy edge.

In large weaving it is usual to begin with a few shots of "roving" or of carpet rags, which can be pulled out when you have finished your strip. This makes a solid piece against which to beat the body of your work when you begin. However, you will have a fringe on your scarf, so just start with your white weft, which you should have wound onto the shuttle, and you can pull out the first few rows when your scarf is finished.

The table loom may operate with levers. Whatever the device, press the one on the right hand (weaving is always done from right to left) and pass your shuttle through the shed from right to left, leaving about two inches of wool outside the shed on the right. In throwing your weft, it should not be too slack nor should it be pulled. Draw it through so that when

the shuttle comes out on the other side the weft thread will be slightly on the diagonal. Now beat it with your reed. To do this, grasp the reed in the *centre* with your left hand. Even when weaving on large looms, you should use only one hand to beat, grasping the top of the reed or beater in the middle, for your hands are not equal in strength and development, and to use both hands would make one side tighter than the other. If you want a loosely woven scarf, beat only once between each shot of weft. If you want a tight weave, beat once before you change your shed and once after, before you put in the next shot of weft.

Whatever you weave, it is usual to begin with at least an inch of tabby unless your draft gives directions to the contrary.

In this scarf, however, it will be all tabby, since you have only two sheds, so, according to your taste, weave two or three inches of plain white, and then begin your colour variations. This is where your imagination and creative instinct can come into play.

The great beauty of weaving is that it gives an outlet for so many of our urges, and so many varieties of temperament. The instinct for mechanical precision is gratified by the niceties of preparation to weave. The actual process of weaving, throwing the shuttle back and forth, is rhythmic and

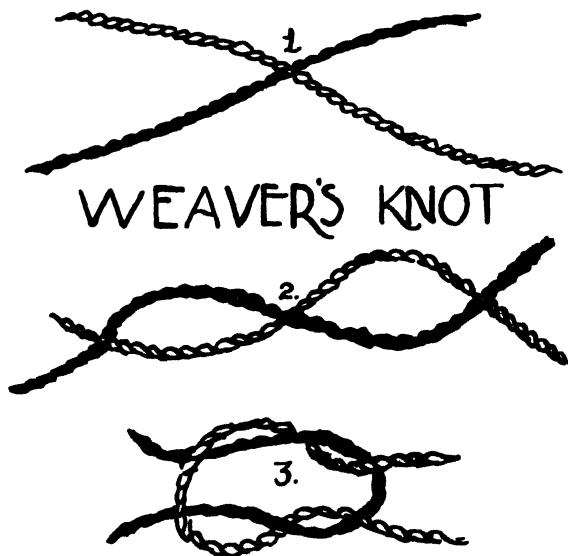


Fig. 20

repetitive, without being monotonous. There is a certain peace and serenity about it. And yet, there is always the pattern to think about, and the treadling to watch, so it never becomes dull.

When you have woven until your work gets too near the heddles to allow for a good shed, it is time to loosen the ratchets and wind the fabric onto the front roller. Leave about one inch of weaving beyond the breast beam. Then tighten up again and continue as before.

When you can no longer get a shed, you have come to the end of your warp. If you want to make something else with the same threading, prepare some more warp, and tie it on to the ends of the old warp with the weaver's knot. (Fig. 20.) This is much quicker, as you can readily see, than having to go through the whole process of beaming and threading again. You never tie the weft threads together, but weave them in. The way to do this is to leave a short end whenever you change your colour. Then, when you change the shed, and before you throw in the next shot of weft, turn back the short end, beat it in with the rest of the work, and the place will be imperceptible.

If you are not going to "tie on" any more warp when you have finished the scarf, cut off your threads evenly, leaving enough for fringe. Pick out the first few rows of loose weaving. If you remembered, as you should have done, to jot down how much plain white tabby (minus the loose rows) you wove before you began the coloured stripes, and calculated the same distance at the other end, you now have an attractive and creditable piece of work.

Now that you have had the experience of dressing a loom and of actual weaving, it will be easy for you to learn to follow designs. Figures 21, 22, and 23 show drafts of traditional patterns. From these you can work out a great many variations with the same threadings by using different treadle combinations.

But first you must learn to read the drafts. It may look complicated, at first glance, but it is very easy. For four-harness work the drafts have five lines



ROSE PATH



ROSE PATH
VARIATIONS

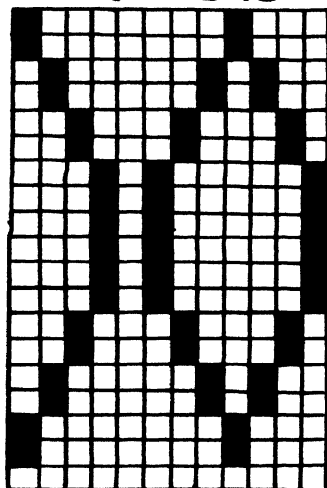


Fig. 21

GOOSE-EYE

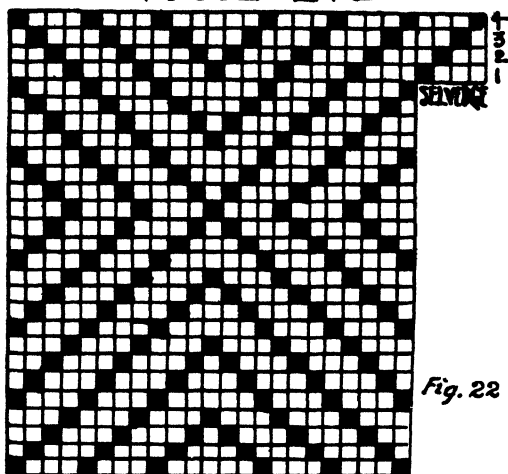
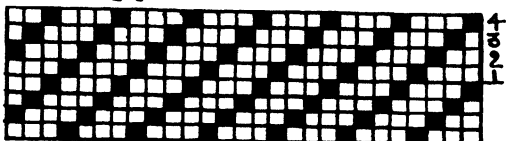
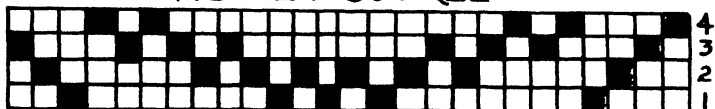


Fig. 22

HERRING-BONE TWILL



HONEY SUCKLE



HONEY SUCKLE
VARIATION

SELVAGE

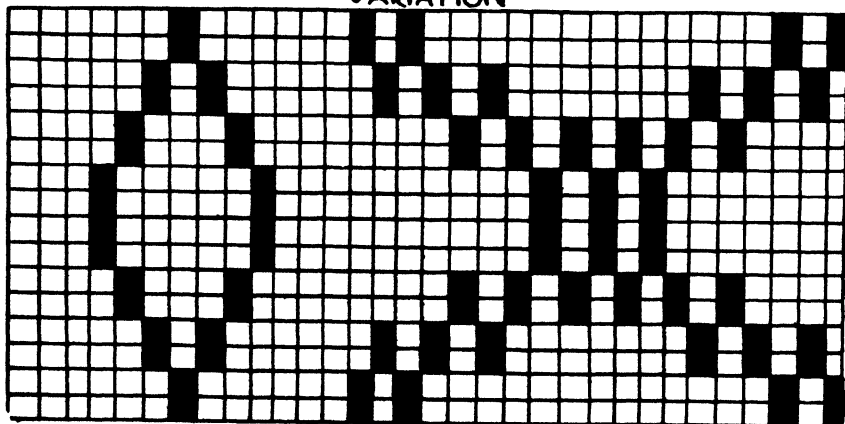


Fig. 23

and four spaces, like a music staff. Each space represents a harness, and the number of each space corresponds with the number of a harness, of course. You already know that harness No. 1 is the first one towards you as you sit at the loom. It is controlled by treadle No. 1, which is the first one on the right hand side.

For looms with more harnesses, the drafts have extra spaces. (There are other ways of notating patterns, but the one given here is commonly used now.)

After you have chosen your pattern, copy the draft. Use graph paper with good-sized squares so that you can see them quickly, or else draw up a graph yourself. Make an *exact* copy of your pattern, indicating the selvedge, and where the pattern blocks begin. Count how many threads are needed for one block.

The way to figure the number of threads for your warp is as follows: Each draft illustrated shows a complete block of the pattern. The number of "repeats" will depend upon the width of your strip. If one block has, say, seventy-five threads, and you want three repeats, you will need two hundred and twenty-five threads, plus four extra at each end for selvedge and the few that you always allow for breaks or lost threads. The selvedge blocks are always lightly shaded, as you will have noticed. If you want to make a strip the whole width of your loom and your pattern blocks do not come out evenly, the way to do it is as follows: Figure out how many blocks with the selvedges you can possibly have. Count how many vacant dents this will leave. If you can make a thirty-inch strip on your loom, 15 dents to the inch, you will have to fill four hundred and fifty dents. Suppose you can get eight pattern blocks of fifty threads each, allowing eight threads for selvedge, you would have 42 empty dents. You can, if you like, put in seven extra threads between every two pattern blocks, threading them 1, 2, 3, 4, 3, 2, 1, and this will give you your maximum width.

For one pattern you can get a number of variations and this is possible because of the treadling, as mentioned above. Treadling is easy to understand, and a good way to master it is to select for your first pattern a small one such as the Rose Path or the Honeysuckle, and then try out all possible treadle combinations. Usually drafts give one or more treadling schemes, but when you understand it for yourself, you will be able to study a pictured design and by trying out the different sheds and noting where the weft skips over, you will be able to work out the treadling variations yourself.

As was pointed out in the description of the loom, a four-harness loom may have four treadles, one for each harness, but it may also come with

six. In the former case, you will have to depress two pedals to get a shed, but in the latter case, you can tie two of the "lamms" which control the treadles together, and then use only one foot to raise two harnesses. With either four treadles, or six, you can get six different sheds on a four-harness loom, and as two of these will create your tabby, you will see that you can get patterns arising from four different treadle combinations. It works out like this:

With four treadles: 1 and 3, and 2 and 4 will be the tabby. Then you still have 1 and 2, 1 and 4, 2 and 3, and 3 and 4, making six different sheds.

With six treadles and a tie-up, the number of sheds will be just the same, and if you are going to work this way, decide which pedals you will keep for your tabby, and then plot out your tie-up scheme. Some weavers keep the two outside treadles for tabby, some the two end ones, either right or left. This can be at your own discretion.

The treadling for the simple Rose Path goes like this: 1 and 2, 2 and 3, 3 and 4, 4 and 1. Put a row of tabby in between each pattern shot. Remember that weaving is always from right to left, with the exception of the shuttle, which must, of course, go back and forth. Your first tabby shot will be on treadles 1 and 3. (You can think of treadling as either "lowering" or "raising" for both are true—as you lower the treadles you raise the corresponding shaft.)

When you make out the threading draft be sure to put down the treadling, then tack the graph onto the harness brace, for you will be referring to it constantly. Until you become so expert that a look at your weaving will tell you where you are and what to do next, mark down in pencil where you leave off, so that you won't make a mistake when you come back to your work.

Of course if you do put in a wrong shot, it isn't fatal or final. You can take it out again, and you will probably have to do this once in a while. If you are a true weaver you will become devoted to your craft and take a great pride in being painstaking. In a short time you will learn to go along rhythmically and smoothly and the treadling changes will sink into your consciousness and then come out in order and proper sequence. It will never become merely mechanical, though, for handloom weaving will never make a robot of you.

A good practice whenever you thread an untried pattern, is to make about a yard of sampler, trying out different treadlings, and keep this in your weaving file. You can make a log book, noting down the experiments you

have made and what you have found out, for you may chance on a combination that has never been recorded, and by keeping a book you will be able to reproduce it again.

After you have woven part of a pattern, if you want to see how it will look when complete, hold a mirror beyond it, and you will get the finished effect. If you are working out a treadling for yourself, this is especially helpful.

Of course, as you go on, you will devise patterns of your own. Imagination and originality, as well as a regard for good precedent, have always been characteristic of the weaving art.

If you have followed directions carefully and have checked as you have gone along, you will not run into any snags. Once in a while, however, a warp thread breaks. This is easy to remedy. If it breaks behind the harnesses, just wind a warp thread on a spool heavy enough to give tension, and tie it to the broken thread with a weaver's knot (Fig. 20), then let the spool hang down over the warp beam. You will have to make a loose knot against the spool, and then pay it out from time to time, as your weaving proceeds. If a thread breaks in front of the heddles, check it to make sure it has not slipped out of its proper place, then loosen the warp, and tie the thread.

You will find three pattern drafts at the end of the chapter. With different treadlings and colour variations you can get dozens of beautiful designs from these. Try them out with cotton, linen, and wool weft and appropriate warp.

When you have gone as far as this, you will never be satisfied unless you learn more about the many kinds of looms and the infinite ramifications of the craft. The history of weaving is tremendously interesting. Now, as never before, you will be able to appreciate the beautiful tweeds that come to us from England and Scotland and the wonderful native weaving from European and Eastern countries. You will view with a craftsman's eye the marvellous tapestries and carpets preserved for our inspiration in museums. The famous Unicorn Tapestries in the Metropolitan Museum of New York and the wonderful old rugs from Persia and the Near East all derive from that first outreach for comfort—weaving together branches to make a wind-break for some prehistoric infant, and hanging warp threads from tree limbs, weighted with clay or stones. And how did they get those first warp threads—well, that is another story.

ANALYSIS OF PATTERN DRAFTS

Figure 21 shows the threading draft for the Rose Path, a simple but very attractive pattern for small weaving. Suppose you try this one for a start. We will say that you are going to make an eighteen-inch wide runner. Our loom has fifteen threads to the inch. We will therefore have to have two hundred and seventy warp threads for our pattern, plus four at each end for the selvedge—two hundred and seventy-eight in all. The Rose Path pattern block has eight threads, as you see. Divide the number of warp threads (less the selvedge, the shaded blocks) by the number of threads in your block and you will see that your pattern will be repeated 34 times with six threads over. In the Rose Path, those extra threads will not make much difference, but in some very definite patterns, you will find it better to work out the threading so that the pattern comes out evenly along both edges. For example, we could, in this case, begin threading with the fourth thread in heddle 4 and then when we reached the other end we would come out at heddle 4. But this first time, let us forget about that, and follow the rule exactly.

The first thing to do is to copy off the threading draft on a piece of stiff paper. Underneath write the treadling directions, and tack the paper up on your loom.

The simplest treadling for the Rose Path goes like this:

1 - 2
2 - 3
3 - 4
4 - 1

This means that first you lower treadles 1 and 2 (together) and put in a shot of weft. After every shot of weft you change your shed, by lowering dif-



ferent treadles. Between every pattern shed you put in a shot of tabby. Your tabby sheds are 1 and 3 and 2 and 4. Unless directions are given to the contrary it is taken for granted that you put in the tabby binder between every pattern shot. The way to indicate this, so that there could be no possible mistake about it would be to write your draft this way:

$$\left. \begin{array}{l} 1 - 2 \\ 2 - 3 \\ 3 - 4 \\ 4 - 1 \end{array} \right\} 1 \times \text{each, with tabby}$$

Suppose you use, for your tabby weft, beige colour, and for the pattern, turquoise. You will need three shuttles—one of each colour, and one with roving or rags for the first few rows, as explained before.

After you have woven in five or six rows of rag, using the tabby sheds, and remembering always to read and begin work from right to left, weave an inch or so of plain tabby with your beige weft. Then commence your pattern. It should go like this:

Lower treadles 1 and 2 — one shot turquoise weft

1	"	3 — one shot biege tabby
2	"	3 — one turquoise
2	"	4 — one tabby
3	"	4 — one turquoise
1	"	3 — one tabby
4	"	1 — one turquoise
2	"	4 — one tabby

This gives you your complete pattern. Repeat this until your strip is finished.

Between each shot of weft, you "beat" your work. For close work beat once before you change your shed, and once after. Hold the batten in the middle, with *one* hand—your left will probably be more convenient.

If you want to make a sampler this first time, in order to learn more about treadling, try out a number of combinations. You can use two or three shots of weft in each shed, with binder between, for instance. Or you can reverse your pattern, and beginning with the 4-1 shed go back to the 1-2.

Here are several other Rose Path treadlings, all of them requiring the tabby binder:

1.	2.	3.
1-2	3-4	1-2
2-3	2-3	1-4
3-4	3-4	1-2
1-2	1-4	2-3
3-4		
2-3	2-3	1-4
1-2	1-2	3-4
3-4	2-3	1-4
2-3	3-4	1-2
1-2		
1-4	1-2	3-4
1-2	1-4	2-3
2-3	1-2	3-4
3-4	2-3	1-4

Try variations by using a number of colours. You could make a striped runner by using three or four colours with the first treadling and in between each block of colours have two or three inches of plain tabby.

GOOSE-EYE PATTERN

1.	
1-4	2-3
3-4	3-4
2-3	1-4
1-2	3-4
	2-3
	1-2
	1-4
	3-4
	2-3
	1-2
	1-4
	3-4
	2-3
	1-2

Diamond Pattern

2-3	
3-4	
1-4	
1-2	

HONEYSUCKLE PATTERN

This is another traditional pattern, one of the most attractive of the small patterns and with dozens of different results to be arrived at by changes in treadling.

1.	2.	3.
4-1	3-4-1X	3-4-1X
1-2	1-4-1X	1-4-1X
2-3	1-2-2X	1-2-2X
3-4	1-4-1X	2-3-2X
4-1	3-4-1X	3-4-3X
3-4	2-3-1X	1-4-6X
2-3	1-2-3X	3-4-3X
1-2	1-4-3X	2-3-2X
4-1	3-4-6X	1-2-2X
1-2	1-4-3X	1-4-1X
2-3	1-2-3X	2-3-1X
3-4	2-3-1X	1-2-3X
4-1		2-3-1X
1-2		
2-3		
3-4		
4-1		
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6.

(Flower All-Over
Design)

2-1-3x
4-1-3x with
3-4-3x tabby—
2-3-1x reverse
2-1-4x and
4-1-3x repeat
2-1-4x
2-3-1x
3-4-3x
4-1-3x
2-1-3x

7.

1-2-2x
1-4-1x with
3-4-1x tabby—
2-3-1x repeat from
1-2-3x beginning
1-4-3x
3-4-6x
1-4-3x
1-2-3x
2-3-1x
3-4-1x
1-4-1x

8.

(Lover's Knot)
Diamond Border

4-1-3x
2-1-3x
2-3-3x
2-1-3x
4-1-3x
3-4-3x

Repeat for three and
one-half inches and end

in the 2-1 heddle combina-
tion

Big Table

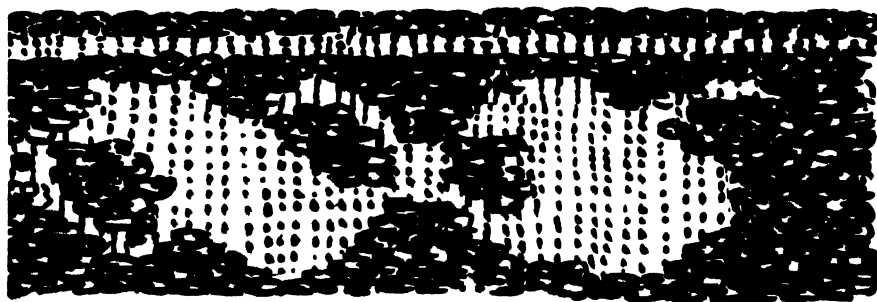
2-1-5x
2-3-2x
2-1-2x center of square
2-3-2x
2-1-5x
2-3-4x
2-1-4x

Small Square or Table

1-4-3x
3-4-2x
1-4-2x center
3-4-2x
1-4-3x

Large Diamond

2-1-2x
2-3-2x
3-4-2x
4-1-2x
3-4-2x
2-3-2x
2-1-2x
4-1-2x
3-4-2x
4-1-2x
2-1-2x
2-3-2x
3-4-2x
4-1-2x
3-4-2x
2-3-2x
2-1-2x



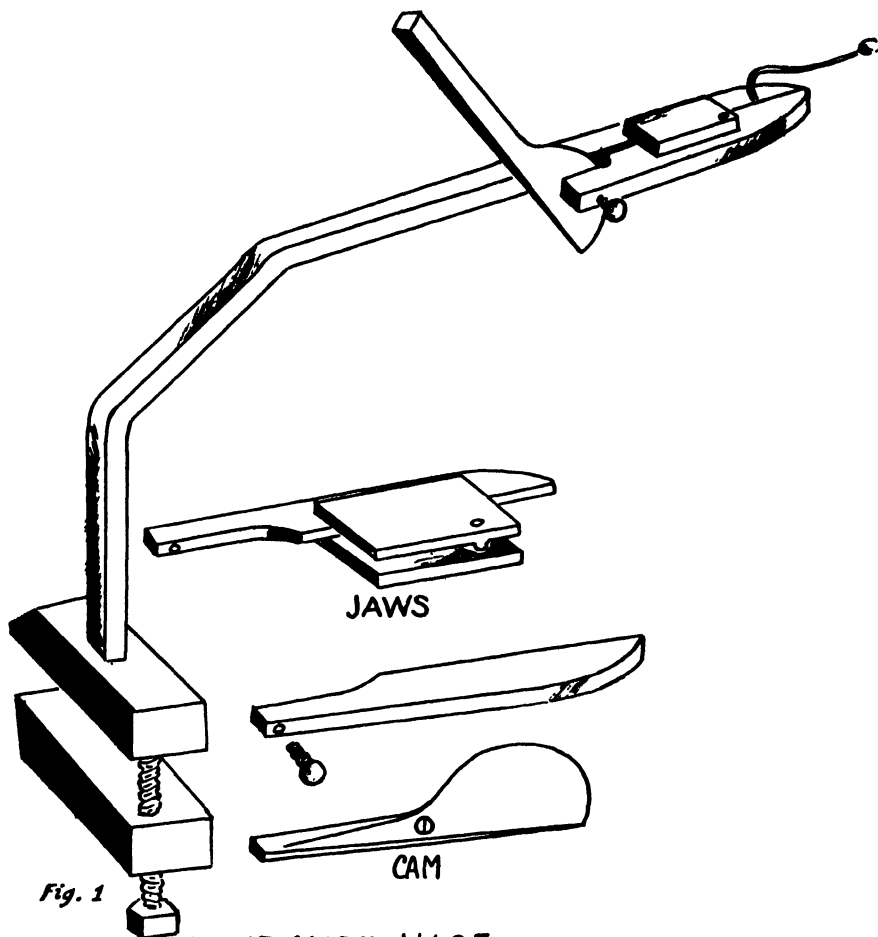
9. FLY MAKING

ON THE CAPABLE shoulders of two Pennsylvania sportsmen must rest the responsibility for this chapter. No book on avocations could be complete, they said, which failed to mention crafts connected with fishing. Donald Esh and Robert Cutler are both veterans of the stony Pennsylvania creeks and mountain runs, so we took their word for it, and made notes while they explained and demonstrated with fishermen's zeal, the principles of fly fishing and fly tying.

Fly fishing, we are told, is in the fine arts class. It is a connoisseur's pastime—for those who fish for the pure sport of it and not for the catch. One who tries to get his fish and fill his basket any way he can is only a "fish hawk." If a fish hawk uses flies, as likely as not he will not know much about them or how to make them, but the sportsman must know it all from A to Izzard. That about sums up the philosophy of all fly fishermen.

Fishing flies are made to look like natural flies. Not from biology books but from direct observation the fisherman knows that flies have a cycle and that they are short-lived. They mate in the air over the water and lay their eggs on a limb or a leaf which eventually falls into the water to lie and incubate for a year or more. Sometimes the "incubator" is eaten by the fish. When hatching time comes, the shell or covering breaks, the larvae develop and float to the top of the water, the new flies emerge to mate, lay eggs, and to fall on the stream again for the hungry fish, continuing the cycle. There are hundreds of kinds of flies, each of which has its day. The astute fisherman sometimes wades into the stream and gets some of the larvae which are about to hatch, so that he will know what kind of artificial fly to use that day. That is why there must be so many varieties of fishing flies in a good kit.

A fly fisherman's needs are simple: a good fly rod, a reel to hold the tapered line, a fish basket, a pair of hip boots, and a book of flies. These and day-break on a creek or mountain stream are all he asks for. Little bubbles tell where a fish is jumping. He looks to see what fly is on the water, selects one like it from his book or from the piece of sheepskin on his hat band. After the fly is attached to his line, he wades gingerly into the water, casts his line far over the surface, drags it a little, waits, reels it in, and repeats this over and over again, until a fish strikes, and the battle is on. Sometimes the fish



HOME MADE VISE

strike fast, sometimes they are “not feeding” and won’t strike at all. Anglers sometimes use a barbless hook and throw over even legal sized fish in hope of a more challenging tussle.

FLY MAKING TOOLS

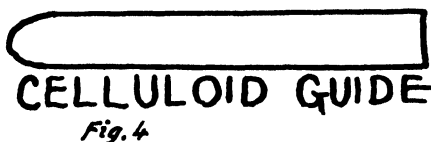
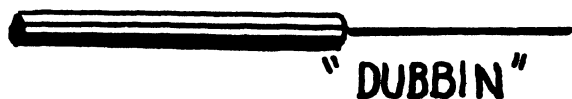
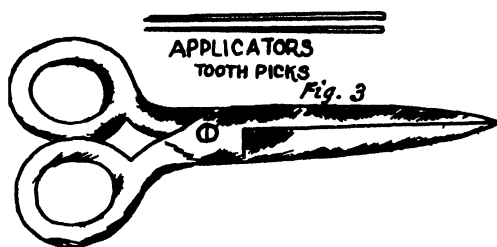
The vise illustrated in Figure 1 was home made. The parts and assembly (jaws and cam) are shown in detail in the event that some one should want to make one, but they can be bought from any supply house.

The hackle pliers (Fig. 2) were also home made. A piece of one-eighth inch welding brass was used.

The “dubbin” is a match stick with a needle stuck in the end of it. (Fig. 3.) The celluloid guide was cut from a shirt collar; the applicators came from



HACKLE
PLIERS
4½"
Fig. 2



the first aid case, and the scissors is usually filched from a sewing basket. (Fig. 4.)

These are the tools which a fly-tyer needs.

Besides the tools, he must have hooks and snells, which are short pieces of gut used to fasten the hook to the leader. The hooks vary in size from very small ones to those which are large enough to hold a bass.

Quills or parts of feathers are used for the bodies of the artificial flies. Rabbit fur, coloured woollen yarn, chenille, and tinsel are also used for the body of the fly. Hackle, which is composed of feathers, is used for legs and wings.

Dubbin, a kind of wax, is used to make dry flies water-proof. Lacquer holds the body firm after it is wound onto the shank of the hook. There are hundreds of other materials which the artisan-devotees—the fly makers—have learned to use, but those listed above will do for the beginner.

VARIETIES OF FISHING FLIES

Fishing flies are usually divided into five groups.

The dry fly, which is made to float on top of the water, is covered with wax and made as light as possible. The wet fly is one that is made to resemble a submerged insect which floats under the water. Bass flies are of the dry variety, much larger than the usual dry flies. "Feather Streamers" look like "minnies," by which a fisherman means minnows, or small fish. These, of course, are wet flies, and they are dragged through the water like swimming fish. The "Nymphs" are wet flies which are weighted so that they will go to the stream bed where the real larvae or nymphs are. Besides these there are other subterfuges, such as a bass bug, and most surprising, a mouse. Both of these are wet flies.

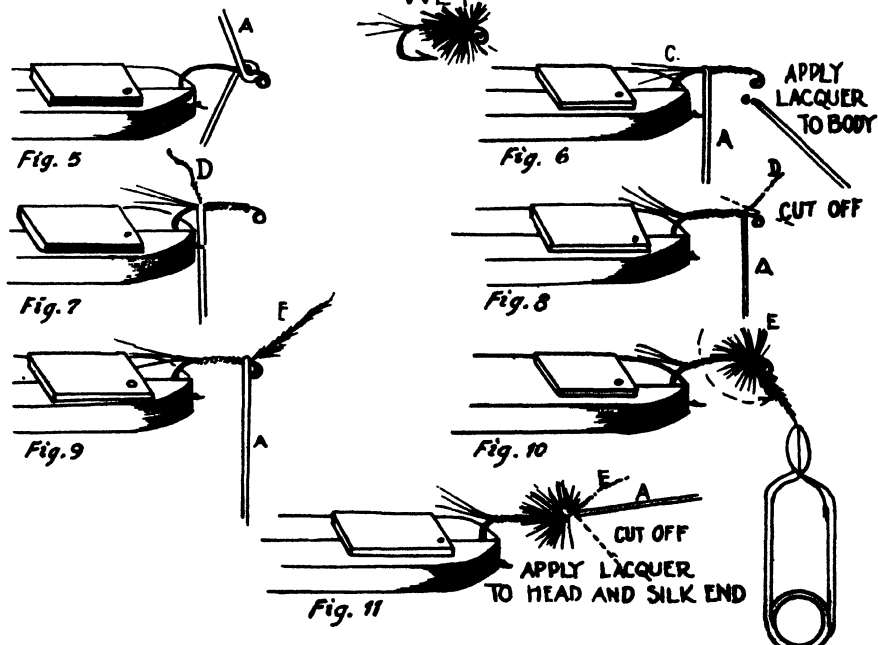
A hackle fly is one of the easiest and simplest to make. It is a wet fly and therefore not to be waxed. This will be a good one to start with for an example of procedure.

To begin, fasten the hook into the vise (Fig. 5) and wrap the tying silk (A) spirally around the body close enough to cover the part of the shank used for this part of the fly.

In Figure 6, the tail (a few barbs with the barbules removed) is attached with the fly-tying silk and lacquer is applied with an applicator. In Figure 7,

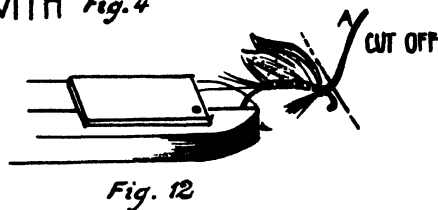
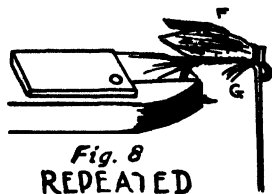
HACKLE FLY

WET



HACKLE FLY WITH WINGS

WET
BEGIN WITH *Fig. 4*



MALLARD QUILL

A	TYING SILK	#00
C	- TAIL	E - HACKLE
D	- QUILL	F - WINGS
G	HACKLE	

a quill (D) or centre of a small feather is used to wrap the body. The silk (A) and the quill (D) are wrapped together to the eye end of the hook. Here the remainder of the quill (D) is cut off. (Fig. 8.) Lacquer is applied to make the head and, also to the silk, to hold it secure. Both A and B are then cut off. This completes a hackle fly without wings.

To make a fly with wings, start at Figure 8, after the tail is attached. (Fig. 8 repeated.) Cut two pieces of feather, one from each of identical feathers in a pair of wings, if possible, so that they will be left and right wings on the insect. Attach a small amount of hackle (G) as illustrated in Figure 12. The celluloid guide (Fig. 4) can be placed between the wings until the tying silk (A) is looped over the ends of the wings and hackle and drawn secure. (Fig. 12.) This is called a Mallard Quill, and it is a rock fly.

The dry flies illustrated are the March Brown and the Hare's Ear. Underneath each will be found the "dressing" for them. They are made like the wet ones, excepting for the use of the wax to water-proof them so that they will float.

The Feather Streamers or artificial minnows are made according to the methods given underneath the illustration.

The bass flies are well known, being the Royal Coachman and the Brown Hackle.

This chapter is intended only as a beginning in fly-tying and not as a complete manual. We have space to give only first principles. It will serve, how-



MARCH BROWN
 TAIL - GROUSE
 RIBS - BROWN SILK
 BODY - BROWN FUR
 HACKLE - GROUSE
 WINGS - GROUSE

DRY FLIES



HARE'S EAR
 TAIL - NONE
 RIBS - YELLOW SILK
 BODY - RABBIT FUR
 HACKLE - YELLOW
 WINGS - GREY

FEATHER STREAMERS



PARMACHENE BELLE
 TAG - PEACOCK HERL
 TAIL - SCARLET-WHITE
 RIBS - GOLD
 BODY - YELLOW FLOSS
 HACKLE - SCARLET-WHITE
 WINGS - SCARLET-WHITE



SILVER DOCTOR
 TAG - NONE
 TAIL - BLUE-GREEN-RED
 RIBS - NONE
 BODY - SILVER
 HACKLE - BLUE-GUINEA
 WINGS - BROWN-RED-BLUE

BASS FLIES

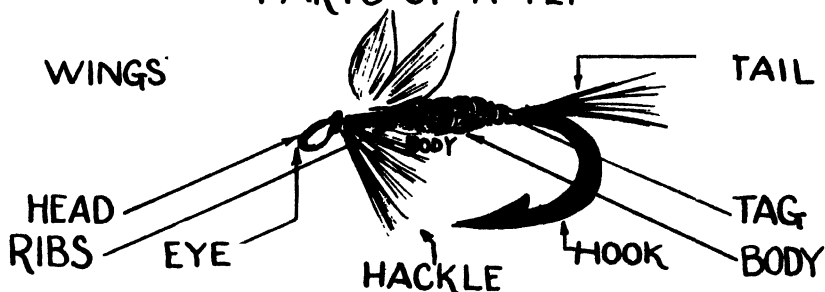


ROYAL COACHMAN



BROWN HACKLE

PARTS OF A FLY



ever, as an excellent start on a highly skilled craft which is almost limitless in scope.

There are many good books to be had on the subject, and a number of outdoor magazines carry articles about artificial flies and their uses. Some of these are *Sports Afield* (Sports Afield Publishing Company, Mt. Morris, Illinois); *The Pennsylvania Angler* (Pennsylvania Board of Fish Commissioners, Harrisburg, Pennsylvania.) At newsstands and in libraries you can find many other periodicals devoted wholly or in part to angling. "How To Tie Flies," by E. C. Gregg, in the Barnes Dollar Series (New York: A. S. Barnes and Co., Inc., 1943), is a valuable handbook for a fly maker.

OTHER FISHING EQUIPMENT

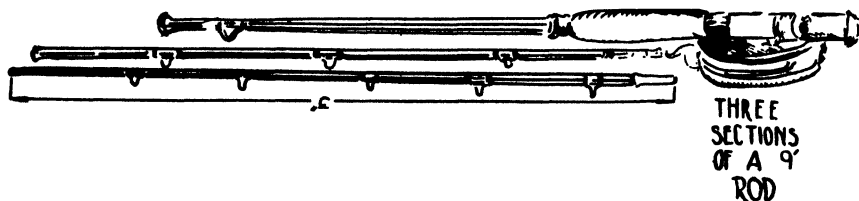
Anyone who finds fly-tying an interesting hobby will want to know about some of the other appurtenances of the Izaak Walton profession.

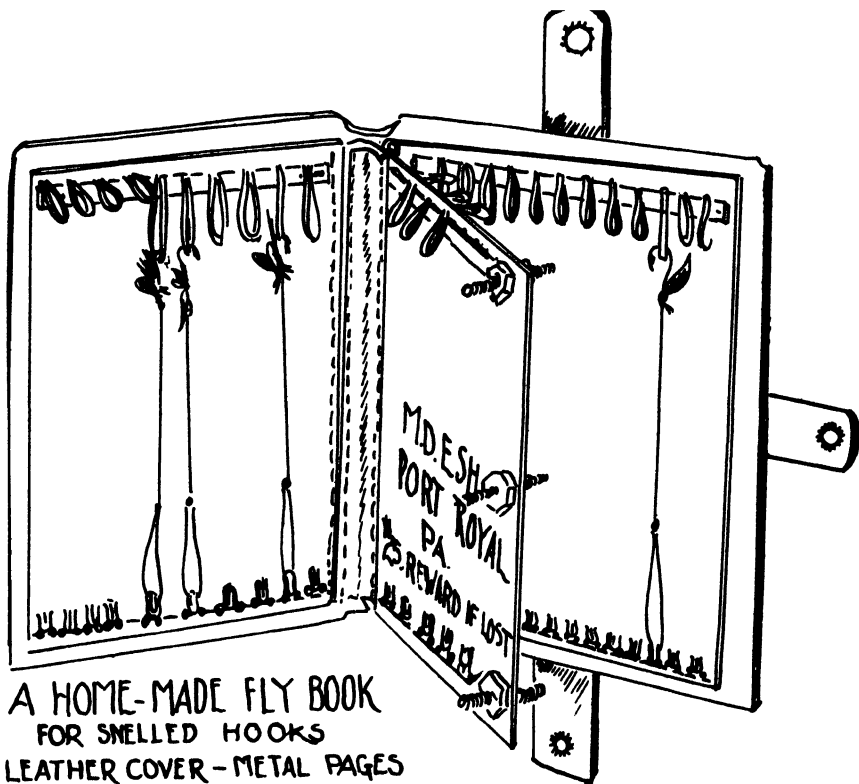
Our two Pennsylvania angling friends, who insisted that we incorporate this chapter, make their own rods. Figure 13 shows the kind they find most satisfactory. It is pentagonal in shape, made of five pieces of bamboo which are glued together lengthwise. This gives flexibility and strength. The guides and the tip are attached with coloured silk thread which is wrapped around the rod. The ends are whipped under. (For directions in whipping, see Figure 24, Page 219, in Chapter XIV.) Then the whole rod is shellacked and varnished to waterproof it.

The reel and tapered line are attached to the handle. The line is made to taper, with the light end towards the hook. A transparent leader of about eight feet is attached to this, and the fly and hook go on the end of the leader.

A good automatic creel saves winding the line back onto the reel and allows for swifter casting.

Other equipment which is shown in the All Weather Camp gives some idea of what a camping fisherman needs.





A HOME-MADE FLY BOOK
FOR SNEELED HOOKS
LEATHER COVER - METAL PAGES

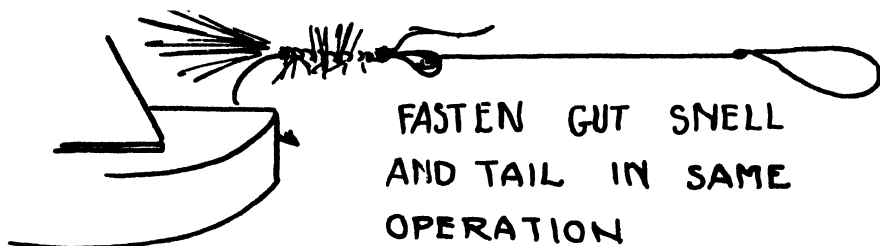
Fig. 14

A fly book is very useful for carrying the flies and the leaders, which come in fifteen-inch pieces and must be tied together. The book illustrated above is made of three sheets of aluminum 6" x 4-1/2". These are made into a book by using strips of leather for hinges. Bore holes in the aluminum and sew the leather to the metal with heavy thread. Then bore holes one-quarter inch apart at the top and bottom of each "page." Attach common hooks with thread and fine wire sewed through the bottom holes. Both sides of the middle page can be used for mounting the flies. Rubber bands are strung through the top row of holes and the snelled hooks are attached as shown in Figure 15. Carried thus they do not become snarled or brushed.

To allow for space between the pages, headless bolts are placed at the three points on the centre pages. Screw in nuts on both sides to hold them in place. A piece of heavy leather one-quarter inch wider than the metal at top and front was used for a cover. It was fastened to the first and third pages by boring holes in the metal one-quarter inch from the back edges. This leaves

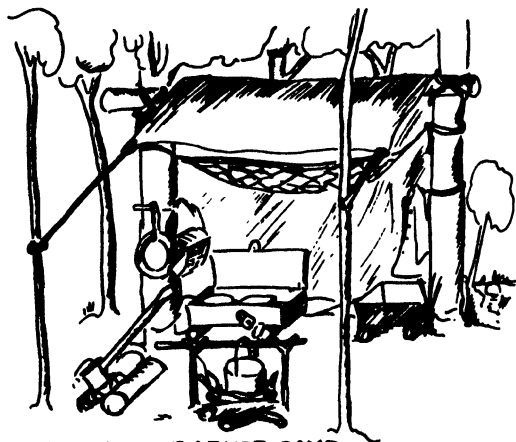
TO "SNELL" A HOOK

A



the leather cover loose from the metal excepting at the back and makes a place to carry leaders and extra hooks.

To prevent the contents from slipping out, a snap fastener was attached to each corner of the leather and each front corner of the first and third pages. Last of all, three small leather straps and snap fasteners were attached, to close the book. The fly book is a cherished possession. The fisherman usually has a strap on his belt from which the treasured "volume" hangs, so that he won't see it floating downstream after an arduous encounter with a strong-willed trout.



AN ALL WEATHER CAMP

10. SOUVENIR COINS

COINS FROM NEIGHBOURING and far distant countries have always been in high favour as souvenirs, often as keepsakes from a happy journey when the coins were the first and sometimes the only contact with the customs and the language of the strange land. The language of the inscriptions and the characteristic designs make them easy to identify.

Often a coin will recall humorous incidents in which the owner figured, and then there is an appeal to the philosopher in all of us when we look at an old coin, or a recent one for that matter, representing a temporal power which has, perhaps, vanished from the earth.

"All passes, art alone
Enduring, stays to us,
The bust outlasts the throne,
The coin, Tiberius."

(Austin Dobson from Gautier.)

For the real numismatist there are fine collections and a considerable literature. The suggestions and instructions given here are for those who have collected a few coins in foreign countries and would like to mount them for safe keeping and to remind them later on of far-off and long-ago things.

The coins used in the illustrations are from a collection which was made during the First World War.

A bracelet, (Fig. 1), can be made from five or six coins and a foot of soft wire. Silver or copper wire are the best if you can get them. The tools illustrated in Figure 7 are all you will need.

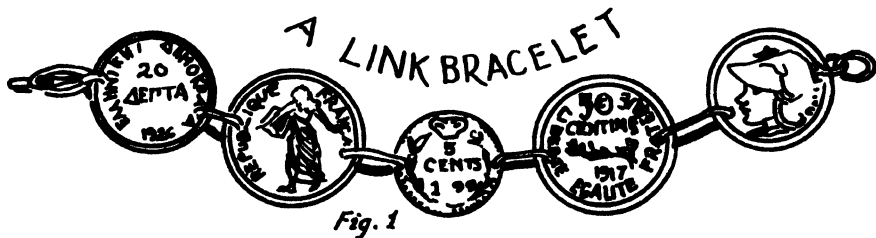
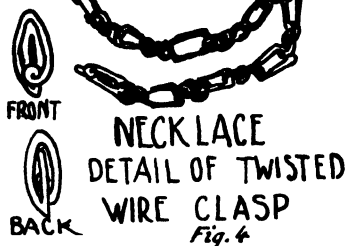
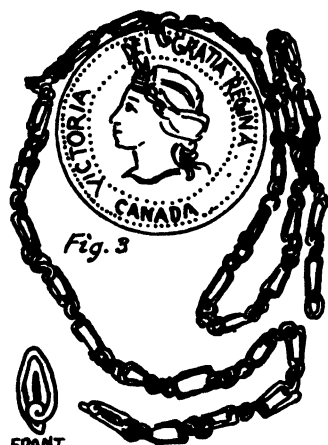
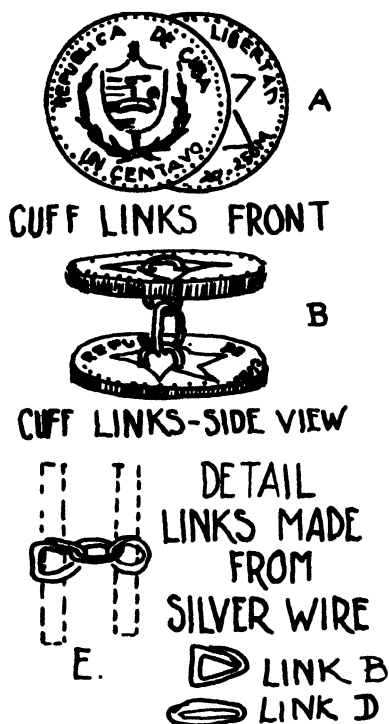


Fig. 2



Drill two holes in each coin, make round wire links with the pliers, and join the coins together. Put on an extra link at each end to catch the fastener (Fig. 4.) The fastener is then shaped and sprung together, after which it is attached to the last link on the other end of the bracelet.

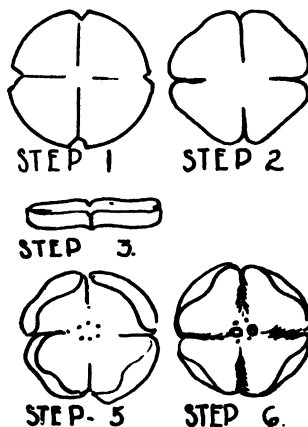
Figure 5 shows how to close the bracelet. The wire must be stiff enough to hold its shape without solder. All of the sharp edges on the fastener, the links, and the holes in the coins can be smoothed with the small file and fine steel wool.

To make the cuff links (Fig. 2) four coins are needed. The two for the front should be approximately the same size but not necessarily the same design. The other two should correspond in the same manner. Bore two holes about three-sixteenths of an inch apart (Fig. 2A) in each coin to allow link (C) to be attached with the flat end on top. One link is needed for each coin. A long narrow link (D) is used to join them in pairs (E). They are very attractive and they meet the three major requirements for a good piece of jewelry—usefulness, decorativeness, and rarity. Rarity will certainly be



Fig. 5

Fig. 6
A FOUR PETAL FLOWER



admitted of a bracelet which serves as a reminder of distant scenes and battles long ago.

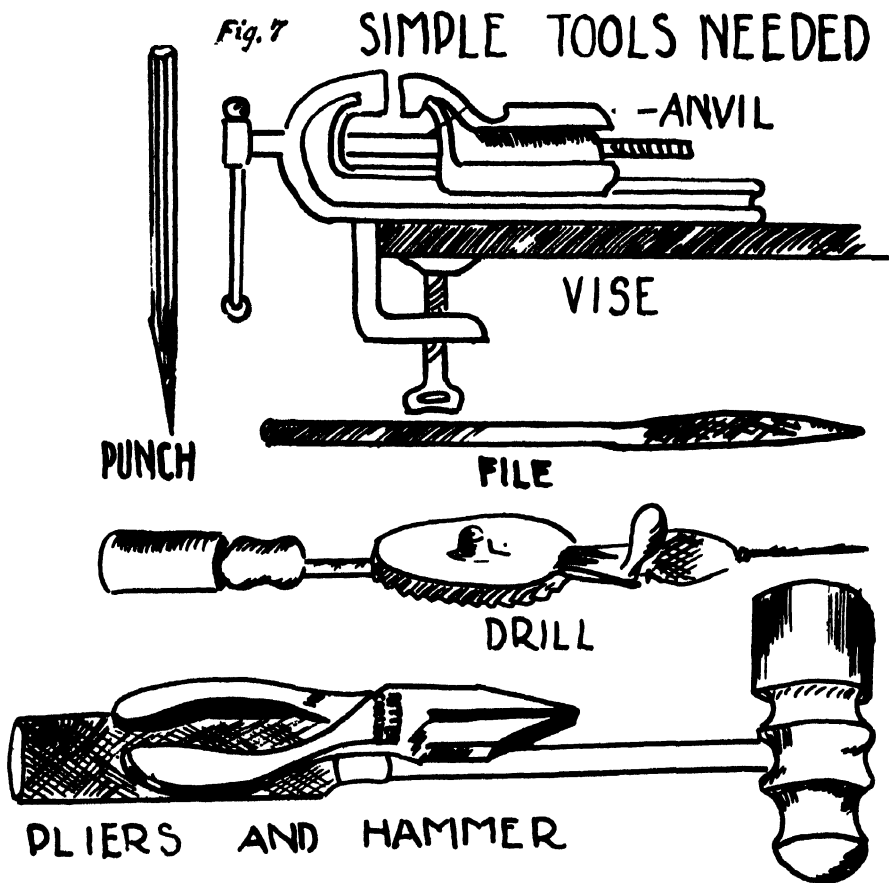
The necklace in Figure 3 is made by drilling a hole at the top of a coin and attaching a round link such as was used to connect the coins in the bracelet. A piece of chain can be bought or the more ambitious craftsman can make his own. If you elect to do this, solder the links, for you will probably make them of finer wire. A fastener similar to that used in Figure 1 is suitable. Special care should be taken to close the links which are not soldered and to smooth the edges to avoid having them catch in the hair or the clothes of the wearer.

This kind of jewelry can be made from small discs or squares of silver, aluminum, copper, or even tin. The discs or squares can be beaten with the round end of the hammer and used without decoration or they can be made into three- or four-petal flowers. The four-petal flower (Fig. 6) is made by filing the notches at four even spaces (Step 1) and then shaping the edges. The lines running toward the centre are cut with the pointed end of the file. All of this is done with the file while the coin is held in the vise. By using the little anvil which is usually in front of the vise and beating the tin with a hammer, you can turn up the edges, and then file them off smooth (Step 3).

Step 5 shows the centre of the flower with six raised places which are made with the punch and the hammer. This work is done from the back of the flower and care must be taken not to puncture the front. The rest of the pro-

cedure is the same as when the coins are used. Other designs can be developed from this one.

One of America's busiest craftsmen began this work in a hospital and has brought his skill to such a degree of artistry that his silver work rates among the best and most coveted of modern making. Anyone who has some taste and talent for design and a little leisure can do interesting things in metalry—perhaps even create some new and fine designs—and mounting coins is a good way to make a start.



11. THE INDISPENSABLE scrap book

SCRAP BOOKS and avocations are a natural combination—one leads to the other. Sometimes it is the scrap book which brings the avocation and sometimes it is the other way round.

The one illustrated here is nine by fourteen inches with a depth of two inches. You can make one any size according to the same directions by adding the allowance for edges, etc., to the finished dimensions.

MATERIALS AND MEASUREMENTS

- 1 piece of cardboard 9" x 14"—for the back (Fig. 1-A)
- 1 piece of cardboard 6-3/4" x 14"—for the front (Fig. 1-C)
- 1 piece of cardboard 2" x 14"—for the hinge (Fig. 1-B)
- 3 pieces of muslin tape 1" x 4"—for attaching hinge
- 2 pieces of paper, muslin, or oilcloth 11" x 16"—for the covers (Fig. 2).
- 2 pieces of lining paper 8-1/2" x 13-1/2"

Potato block printing was used for applying the design on the covers (Fig. 2.) If you decide to decorate your covers in this way, that is the first thing to do.

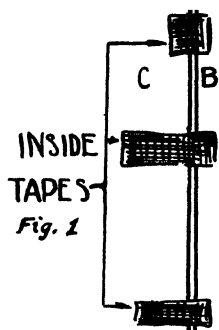
BLOCK PRINTING A COVER DECORATION

A potato block is easily and quickly made. Use one-half of a large potato. (Fig. 3-A.) Mark a design on the cut surface (Fig. 3-B) and cut away the potato around the drawing to a depth of one-quarter of an inch, so that the pattern stands out in relief.

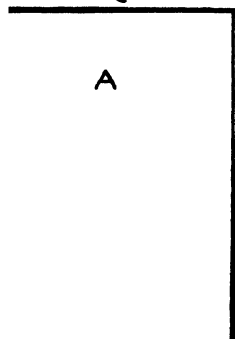
If your design is one that you might want to use again, put it on a more permanent block, for a potato, of course, will not keep. Use a gum eraser, or a piece of linoleum or wood, unless you expect to finish your printing in one sitting.

Because of the moisture in a potato you can use only tempera colour as a

SCRAP BOOK



HINGED FRONT



BACK NOT HINGED



CORNER
Fig. 5

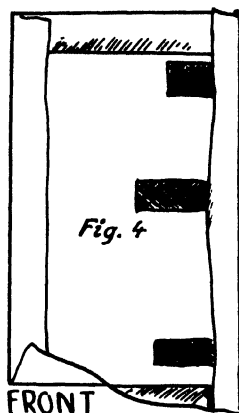
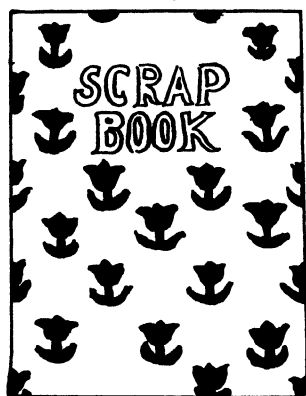


Fig. 4



THE COVERS Fig. 2

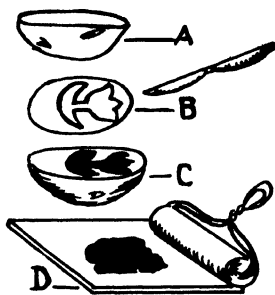


Fig. 3



THE SCRAP BOOK
Fig. 6

printing medium; with eraser, linoleum, or wood blocks, you can use printers ink or oil colours as well. Figure 3-D shows a glass slab with a brayer for spreading the colour over it. Some people like to press their blocks into the colour for printing. A brush serves just as well, however, for inking or colouring the block and there is an advantage because you can use more than one colour if you brush it on.

Arrange the prints in some order to form a pattern; don't just scatter them at random. Be sure to allow space for the name of your book, or whatever legend you intend to use on the cover. The lettering can be brushed on, or separate prints can be made for each letter. This is a considerable piece of work, and only worth while if you would be likely to use the same letters over again. You can also decorate by finger painting, which is described in another chapter. If you do decide to print the letters, be sure to make each one a negative, so that it will be "face up" when printed.

Paste the covers (Fig. 2) to the outside of the 9 x 14 cardboard when the

ing papers or muslin to a depth of one inch on each edge. Mitre the corners (Fig. 5.) Paste the paper linings (6-1/2" x 13-1/2") inside the back and front. Do this very carefully, dividing the space evenly so that the linings come one-quarter of an inch from all the edges.

If you don't want to block print your own covers you can use chintz, oilcloth, or composition leather. If you use chintz or muslin, one way to do is to make a flour and water paste and "paper" the outside boards with the cloth, just as the walls of a room are papered. Use one-third cup of flour to three cups of water. Mix in cold water and boil it until it is quite thick. While the mixture is still warm, dip the muslin into it, soak it thoroughly, wring out and paste it over the cardboards. Smooth it carefully and let it dry. If you use plain muslin and want to decorate it, you can appliqué a design on it. After the cover is dry, dip the cut-out design into the flour paste and smooth it onto the cover.

You will notice in the illustrations that the front (Fig. 1-C—B) is hinged along the back edge with the 2 x 14 piece of cardboard, and a space allowance of one-quarter of an inch between the boards. The back is not hinged.

Common wrapping paper of substantial weight and quality is about as good for pages as anything. You can use construction paper, which comes in many attractive colours, but it is soft and tears easily. The wrapping paper is neutral in colour and makes a good background. Cut the pages 8" x 12" for a 9" x 14" binder.

Use a punch to make three holes for the lacing. Have the holes one-half inch from the back edge of the paper and three-quarters of an inch from the back edge of the finished book. The outside holes should be four inches from the middle hole. Reinforce the holes with gummed eyelets. Fasten the papers into the book with a cord, a leather thong, or metal rings.

If you want a portfolio instead of a scrap book, leave off the hinge and put on tapes to tie the covers together.

AN ART GALLERY ALL YOUR OWN

The real beauty of scrap book collecting is that you can be as inconsequential or as serious as you like. We have solid foundation for saying that, whether you choose to be sublime or ridiculous, several years after you start your clipping and pasting, you will find in your archives some items of interest and value that the most thorough-going research would not turn

up. Some of the most delightful documents of times past have been discovered in informal scrap books of provincial housewives, country parsons, amateur naturalists, physicians, etc., giving sidelights on characters, customs, and events which might otherwise have been lost.

Supposing you have become interested in sketching, from reading and practising the suggestions in an earlier chapter—starting an art gallery would be an excellent use to make of a handcrafted scrap book. Your own private art collection, with yourself in the role of one-man jury and head curator will give you plenty of work to do and lots of fun in pursuing and hunting down your treasures.

Between the covers of your private and particular book you can be as dictatorial as you like and can indulge your own taste to the limit. Don't include anything because you think you ought to, but only if it appeals to you or has some special meaning—that is, unless you are going in for a historical collection. In this case, you must lay out your book by periods, and you will shortly have to begin adding "wings" to house the various groups. There will be no difficulty in finding prints. Besides the magazines which give space to art subjects, many museums and libraries sell good colour prints at nominal cost, and there are publishing firms which also make a feature of art prints.

You will want to read about the artists and the various schools and movements, and perhaps add anecdotes and historical jottings to your "gallery walls."

Following are suggestions of some of the painters you must consider for your period collection:

THE MASTERS AND THEIR WORKS

The Early Italian School interpreted the Christian religion to the people. Many of the paintings were done as murals, ceiling decorations, and altar pieces for churches and chapels. The public libraries have many shelves of artists' biographies and art histories, if you follow this line.

Giotto, Fra Angelico, Fra Filippo Lippi, and Botticelli must be represented.

Among the Florentines are Leonardo da Vinci, Michelangelo, Raphael, Andrea del Sarto.

The Venetian School included Titian, Tintoretto, Carpaccio, Veronese.

In the Low Countries the influence of the church was not felt so strongly by the artists. Most of their paintings were of lay subjects. Peter Breughel,

Peter Paul Rubens, Frans Hals, Rembrandt van Rijn (or Ryn), Vermeer, are great names among the Dutch and Flemish painters.

From Spain we have many wonderful religious and court paintings: El Greco (Domenikos Theotokopulos), Velazquez, Murillo, Goya.

Gay, extravagant court subjects merging into Naturalism and the Romantic School are the characteristic paintings of France. Antoine Watteau, Jean Honoré Fragonard, Vigée Le Brun, Jacques Louis David, Jean Corot, Rosa Bonheur, Jean Millet—all of these you will want to include.

The English painters are notable for their portraits and landscapes. William Hogarth, Sir Joshua Reynolds, Thomas Gainsborough, Sir Thomas Lawrence, John Constable, J. M. W. Turner, are great eighteenth and nineteenth century figures in the history of painting in England.

John Singleton Copley, Benjamin West, Gilbert Stuart, and Thomas Sully are the outstanding American artists of the early days. They painted portraits of the great historical figures of colonial and post-revolutionary days.

Around 1830 the Hudson River School came into prominence and brought to the fore such painters as George Inness, William Morris Hunt, John La Farge, Frank Duveneck, and William M. Chase. Other well known American painters are James McNeill Whistler (expatriated American), John Singer Sargent, Winslow Homer, Albert F. Ryder, Thomas Eakins.

When you get down to modern art in France look up Daumier, Cézanne, Renoir, Van Gogh, Dégas, Picasso, Matisse. Van Gogh and Picasso were not natives of France, but they are associated with the French school.

For information about contemporary painting, read the art magazines, and follow the notices of exhibitions in the art sections of the newspapers.

SPECIAL COLLECTIONS

If there are children in your family or among your visitors, charm them with a collection of childhood favourites: The round-cheeked, large-eyed children of Renoir, Goya's Don Manuel Osorio, Gainsborough's Blue Boy, Kate Greenaway's delightful children, and prints of the many excellent contemporary illustrators of old and new children's books. Add thumb-nail sketches of the artists' lives with notes about the periods and countries in which they lived and worked and your book will be a welcome addition to any child's library.

Découpage is a byway that may interest you. You just cut out and paste together on a background any objects that appeal to you. You can use a theme, or not. Old theatre programmes, trunk stickers, newspaper clippings, oh, anything, can be worked up into a composition to express you or your interests.

If your taste is toward the classics, open a gallery for sculpture and architecture, and fill it with photographs of Greek and Roman antiquities. Mediæval architecture is another interesting field, especially since there is a great revival of cathedral building today, and there will be much restoration work going on shortly.

Other topics with prolific possibilities are music and musicians, current history, sports, cartoons, inventions, newspaper and magazine verse. The list is endless. Make your scrapbook and give your individual taste free rein, and you'll have lots of fun ahead of you.

READING AND WRITING

Reading and writing are among the choicest pastimes, but few of us have time enough for them in the ordinary course of events. If, however, you are on leave from customary occupations for one reason or another, it is a rare opportunity to go off at some special tangent and have an unusually good time.

Even those who are not, as the saying goes, "readers by nature," can find much enjoyment in books if they set about it in the right way. No one, in fact, is a reader by nature. Those who like reading are those who got off to a right start when they were very young.

The most obvious and one of the most delightful things to do is to pick out a subject which you've always wanted to learn more about, and to read up on it from every angle. Many of us are always planning to do this very thing and never quite getting round to it.

Your new scrap book will be a good auxiliary for "special events" in reading and writing. You might use it as a combination book of quotations and sketches, or, for the present, just for a storage warehouse, until you find a tack you want to hold to.

A very interesting collector's item would be a list of classified book titles. A great many books have quotations or paraphrases of quotations for titles. The majority of them seem to come either from the Bible or Shakespeare.

Take a pencil and paper, and see how many titles you remember. If they are quotations or adaptations, can you tell the source? It makes a very good game. You can draw your friends in on it, if you like.

Here are several, old and new, that come to mind: "Many Inventions," "The Way of All Flesh," "This Above All," "Breathe Upon These Slain," "Figs From Thistles," "A Thousand Shall Fall," "My Darling from the Lions." Can you place any of these?

Send for some publisher's catalogues, and follow the book sections of daily and Sunday papers and of magazines, clip or make note of titles which are reminiscent and make other divisions according to your fancy. Book titles reveal many things, particularly the thoughts and trends of their times.

Making note of memorable thoughts, phrases, or even single words come upon sometimes in random and insignificant reading will result in an unusual book of quotations and give you amusement and pleasure. The writer has for years been on the lookout for a sonnet read over a neighbour's shoulder in a bus. The name of the paper was concealed. But the thought and one line have remained. It was addressed to a "poet of one poem" and the conclusion was that he had "dug a knife between the ribs of time." Sometime it will be run down in somebody's scrap book!

Have you ever seen a "Family Tree" for a line of reading or study? It is made just like a genealogical chart. You put down a basic topic you want to read up on, or a book which has started you off on a new line of thought or investigation. This is the ancestor of a line of reading or study. As it leads you to other books and related matters, you add stems and branches, and before long you find that the original book has begotten a large progeny.

For suggestions on how to begin writing, we might refer you to the chapter on "Sketching from Scratch," for it applies very closely. All you need to begin with, as you were told there, is a pencil and lots and lots of scratch paper. Then, instead of drawing tumblers, and plants, and the people who come and go about you, describe them in words instead. You may already have ease of expression, but if you start trying to create pictures and impressions with words you will find yourself feeling the need of a few more synonyms and antonyms and will become style conscious. Even though you may have no professional aims, you will have a certain pride in keeping your private sketch book up to a good standard.

If you are interested in professional writing, get yourself down to a schedule—if it is only for half an hour a day—and do some honest practising in the type of thing you want to do.

You may have forgotten all you ever learned in school about the structure of the language, so that a reference book or two would be a great help. (Studying another language always gives you a better understanding of your native tongue, by the way.) There are a number of good standard desk books to be had, and there are several magazines devoted to information of interest to writers. These will tell you about markets, rates, etc.

12. CARVING in the round

IF YOU HAVE LIKED WHITTILING away at a branch of a tree or a stick, you might as well go a step or two farther and whittle to a purpose—really whittle and chisel wood into forms. Then you will be a wood carver, and associated with a noble craft.

Many expert whittlers use only an ordinary pocket knife with two or three blades; the larger blade for rough cutting, the smaller ones for the fine work. For some things a small curved chisel is useful. Your blades must be sharp; casualties arise not from sharp knives but from dull ones in wood carving. If you like a rigid blade, use a sloyd knife.

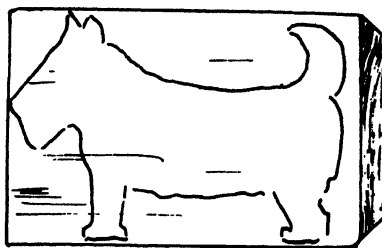
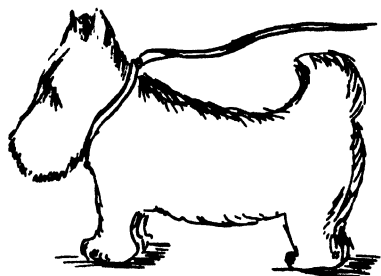
Remember to whittle away from yourself. There are times when you cannot hold to this, but if you must whittle towards yourself, keep the hand holding the wood behind the knife blade. Do not hold the wood against your diaphragm or your knee.

Soft white pine, straight grained cedar, basswood, and poplar are all fine grained woods and do not splinter; they are also strong enough to hold up and easy to work, therefore we recommend them for your first wood carving.

Learn to observe the graining of the woods you use. Sometimes wood is grained in such a way that it is given to splitting at a certain point. You must take steps to prevent this, and the best way to do this is by making a "stop cut" along the outlines of the figure. That is, you hold the knife nearly perpendicular and draw its tip slowly along the outline, making a vertical cut. This stop cut will sever the fibres of the wood and prevent splitting.

A good general rule is always to go slowly and to make small cuts. Pare away small chips and keep the work and grain under constant control. Whittle with the grain when possible.

As an easy step from making shavings, try carving the dog illustrated from a block of wood, beginning with drawing the design on the block as



WOOD $3\frac{3}{4} \times 2\frac{1}{2} \times \frac{3}{4}$

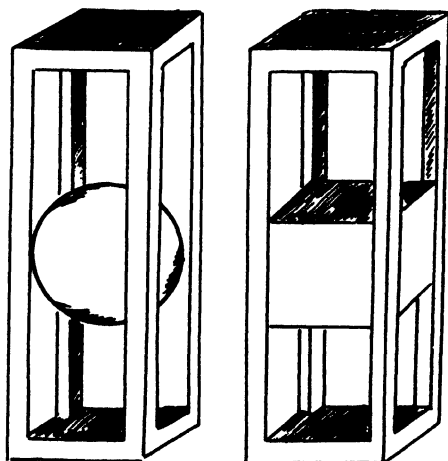
shown above, then tracing the figure on the other side of the block.

The caged ball is another good beginning project, as it takes in many of the tricks of the accomplished carver and will also tell you whether you have the patience to go on with this work.

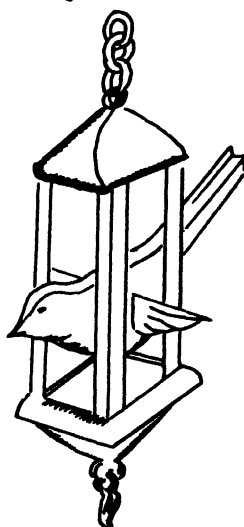
Start off with a squared-up piece of pine about six inches long and one and a half inches square. Mark the outlines of the cage bars by drawing straight pencil lines one-quarter of an inch from each edge and three-quarters of an inch from each end.

Now draw two one-quarter inch squares at diagonally opposite corners of one end of the block and measure the distance between them. This will give you the greatest diameter of a ball that will turn in the cage. Begin to whittle by drawing your knife blade along the lines marking the inside of the cage bars, making a fairly deep incision. Draw the knife blade in the same way along the lines marking the top and the bottom of the ball. Continue by cutting out the waste wood at each end until the block appears.

BALL IN A CAGE

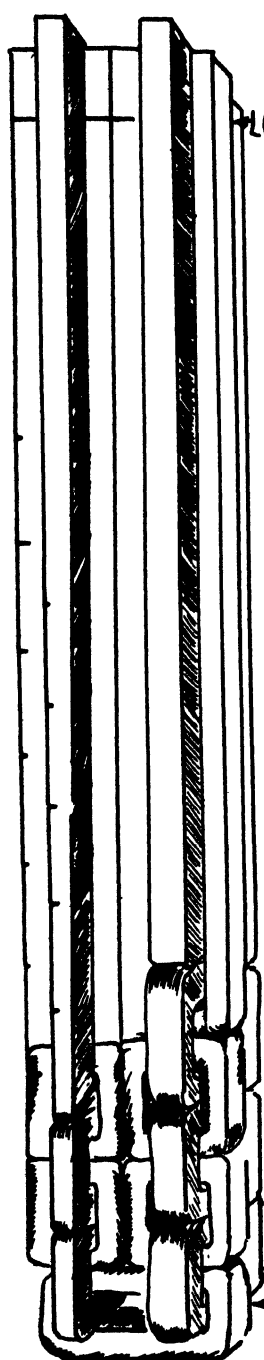


BIRD IN A CAGE

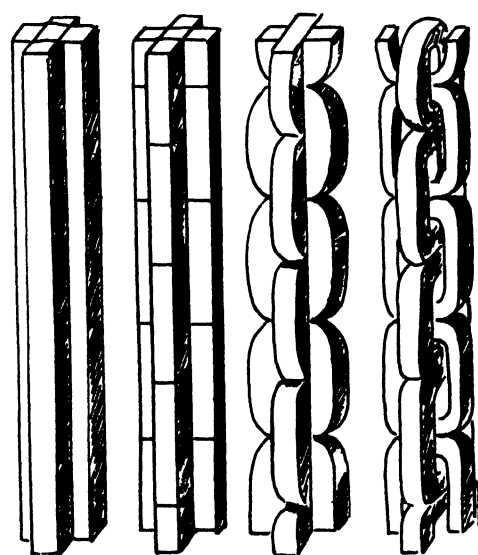
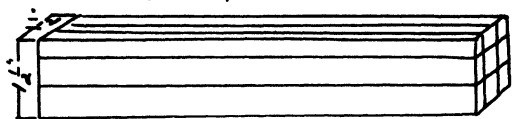


DETAIL SHOWING HOW TO BEGIN UNBROKEN CHAIN

LONG LINK



CARVING A CHAIN



STEPS IN MAKING

LONG LINK
CUT FIRST

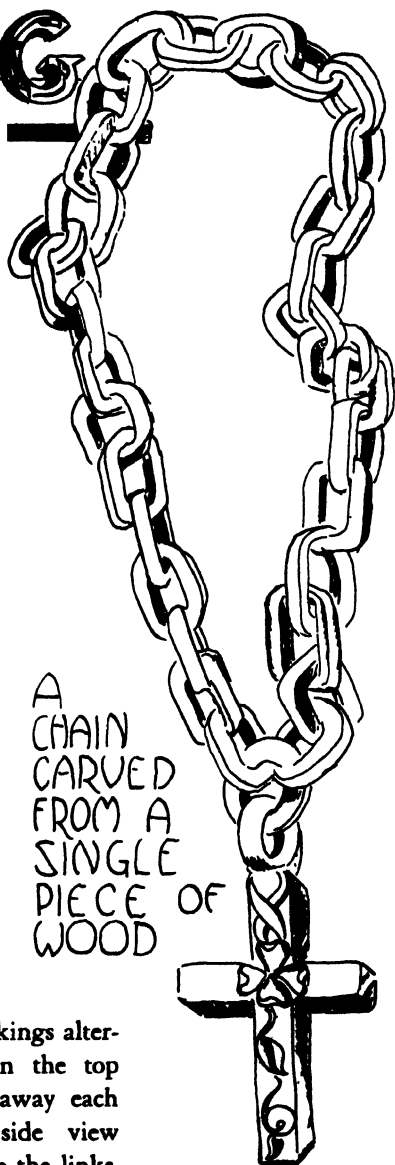
CARVING

The next step is to whittle out the ball from the square block of wood in the centre of the cage. Begin by cutting off the corners of the block, slowly rounding them, then gradually separating the block from the cage. When this has been done, the centre block will move up and down. Take off small pieces until you have a round ball—not too small lest it slip out. The bird is made the same way.

To carve a wooden necklace you will need a piece of wood ten inches long, three and one-quarter inches wide, and one and one-half inches thick. Follow the various steps illustrated in drawing the design on the block and carving the links. Use straight grained sugar pine or basswood, and do your carving with the small, thin blade of your pocket knife.

Divide each side of the block into three half-inch-wide strips. Cut away the four corners and you will have a piece like the first step shown on page 198. Mark this off in one-inch or two-inch intervals, depending upon the size of the links you wish to cut. Notice how the markings alternate. Draw the outline of the chain on the top and on each side, and carefully whittle away each of the shaded parts shown in the side view of the chain, except the shaded parts inside the links. When you have done this you will have a block of wood one-quarter inch thick with the semicircular outline of the vertical links projecting above and below it.

Work slowly and cut away one link at a time. When all links are cut loose they can be rounded with sandpaper. To attach the cross or pendant, the joining link is opened and glued together.



KATCHINA DOLLS

The Katchina dolls are peculiar to the Hopi Indians who live in the southwestern part of the United States. They symbolize the spirits or gods who taught them all their skills such as hunting, weaving, how to plant their corn, etc., and they believe that due to the teachings of the Katchina, the Hopis are the wisest of the Indian tribes.

As shown in the picture, the Katchina were very awkward people and had hideous faces. They would come at certain seasons of the year and give their training, and then the Hopis would show their appreciation by holding a festival of dance and song. This custom is continued today and all during the year the fathers make the dolls and give them to their children at the close of the celebration.

Large Katchinas

For large dolls use pine block 6 by 6 by 12 inches. First round the block by cutting away the corners. Then shape arms and feet. Smooth with fine sandpaper. Add small features to head by first whittling from a separate piece of wood and leaving a small peg at end to be attached to head. Drill a hole a little larger than the peg where the piece is to be placed. Cover peg with glue and insert it. Decorate the dolls with tempera paints in bright colors. When dry, cover with a coat of clear lacquer.

Small Katchinas

These dolls are made from pine block 4 by 4 by 6 inches. First round the block by cutting away the corners. Taper somewhat at top. Add different headdresses. Paint bodies alike and add features as follows:

1. *The Rain Maker* has tadpoles on his headdress to symbolize the coming of rain. He is the most important Katchina, as rain is essential to the crops.

2. *The Clown* does silly dances, much like our circus clowns, and is a general fun-maker at the ceremonies.

3. *The Story Teller* has a little legend attached to him. He was walking through the woods and all the birds lit on his head and shoulders. So this Katchina has bird feathers and foot tracks on his head. He tells funny stories to the tribe.

4. *The Water Maiden* appears during the rain dance. Her headdress is of clouds with rainbow colors.



A TRIPTYCH FROM MOULDING

The triptych illustrated was made from thirty-two inches of hand-carved moulding. A template is an aid in cutting the moulding. A small curved chisel and a straight bladed one are suggested for this work—although experts with the penknife will recommend their own tool, in all likelihood.

Study the detail drawings of the triptych and you will see how to proceed. It is not really difficult, but it calls for nicety and precision. This one was hand-carved in Guatemala. Low relief carving decorates the borders and the outside of the triptych. It enshrines a madonna painted with oil colours, but you could use it for family portraits.

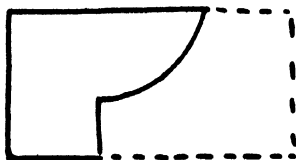
Carving in wood can be described as carving in the round, or as bas relief, which is half round or shallower. The chess men in one of the game chapters of this book are examples of the former, and the carving of the hinged picture frame demonstrates the latter. The wooden bracelet links and the pendant are other uses for low relief carving.

Making the small stamp box is an interesting way to try out the various ways of using the tools. A piece of soft wood four by two by three-quarter inches is needed. Round all of the edges with a knife and carve a design on the top. When this is done, put the block into a vise and saw off the

upper third of the block for a lid. Use a curved chisel to hollow out the lower part. Make it about three-eighths of an inch deep and allow one-quarter of an inch for the thickness of the sides. Small metal hinges or leather strips are used for attaching top to box. The fastener is made of leather on metal.

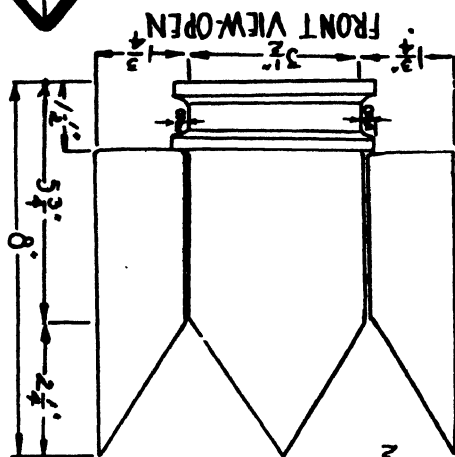
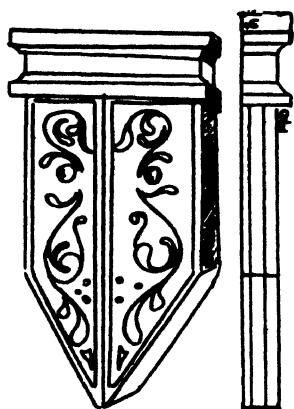
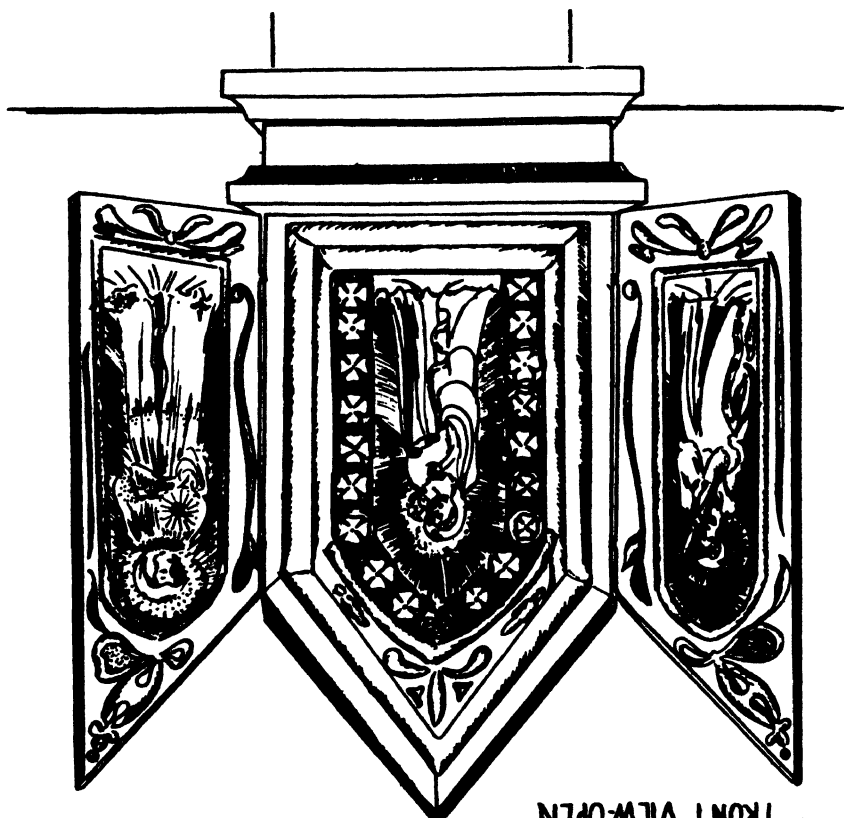
In finishing wood, the object is to preserve the natural colour and beauty as far as possible. First use 4/0 garnet paper for sanding, then follow with

TEMPLATE

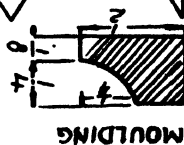


6/0. This is very fine paper, red in colour. Rub lightly, for too much pressure will injure the delicate details. Wax of some sort will best preserve the wood and protect the carving, while having little affect on the original colour. For pine, a paste floor wax has been found satisfactory. For hard woods such as walnut and mahogany, simoniz wax—three or four coats—makes an excellent finish. Apply it with a damp cloth. For cedar use wax first and then automobile polish.

If you want to colour some parts of your carving, you can use water colours—a thin coat first, followed by a thicker layer, and when that has thoroughly dried, the wax finish. But colour, like varnish, lacquer, and shellac, is usually regarded as taboo by the master wood carver.



TRIPTYCH
SUITABLE FOR PHOTOGRAPHS



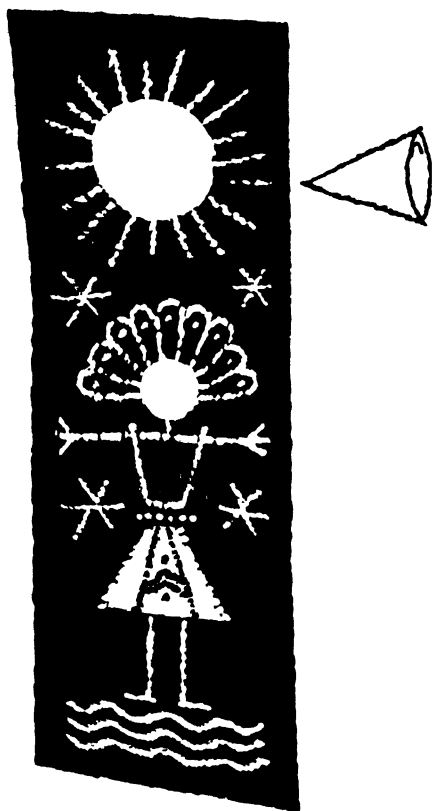
13. SPECIAL CRAFTS

SAND PAINTING

Sand painting is usually associated with the American Indians because tribes living in the desert regions of the Southwest have long blended sands of many colors into treasures of art. While the natural place for making pictures from sand is out of doors, it is equally satisfactory as an art medium indoors, or even to use while lying in bed. The colors are fast and if they spill over on the floor or on bed clothes, no harm is done.

Gather sand in as many natural colors as you can and then make additional colors by soaking sand in dyes made of earth pigments. Place each color in a separate container and make paper cones for spreading thin lines to carry out features and details. Use a thin piece of plywood for the background and waterproof both sides to prevent it from warping. If you expect to execute the painting in bed or while holding it at an angle, outline various areas in the design with a heavy narrow braid that will stand up in relief. This will prevent the sand from spreading to other parts of the design.

Make a sketch of your design on paper first and indicate colors to be used in each area. The sand must be placed on a sticky background, a little at a time, and you will not be able to change your mind before it dries. Since sand itself is so covered with highlights, its sparkling quality gives a pleasing effect without adding much detail to the picture. The picture painted either by covering the whole background with sand, or by painting in a part of it with artist's colors and covering the other parts with bits of sand. If you want to be extremely modern, convert your painting into a montage by adding three-dimensional objects such as shells, sedges, pebbles, or any other material you wish to use to create a mood.



Almost any good liquid glue may be used for an adhesive if it is mixed with liquid starch to prevent it from drying too quickly. If the sand is to be spread on the board so thin that the background shows through, add the same colored pigment to the starch adhesive before applying it to the board. Sand pictures should be made in large dimensions because of the coarseness of the medium.

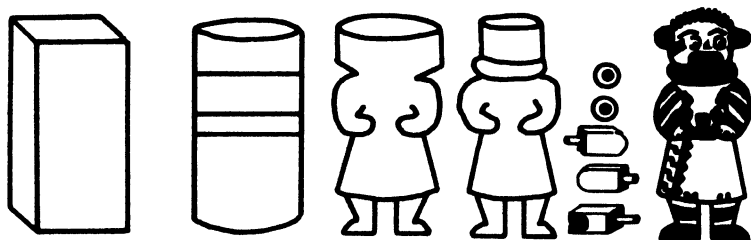
SAWDUST CRAFT

Sawdust has many uses as a craft medium and, if you know a carpenter, little expense is involved except for dyes and adhesive. The tiny granuals of wood will take on a soft, mellow color that makes pleasing designs for decorating plaques, posters, picture frames, and many other objects.

To dye sawdust mix each color in an empty coffee tin or kitchen container. Use one pint of dye to one cup of sawdust. Rinsing dyes may be used for light colors, boiled dyes for darker shades. When the dye is mixed, pour in the sawdust, a little at a time, and stir very thoroughly. When the sawdust assumes the desired color, drain off the mixture and save it for future use. Spread the sawdust out on newspapers or paper towels to dry in the sun if possible.

Sawdust is applied to a background in the same manner as sand. Paint a small portion of the design at a time with mucilage or glue and lay on the sawdust after it has been dyed and dried. Level off the background each time by placing a clean piece of paper over the top and patting it down with your hands. Shake off any loose sawdust.

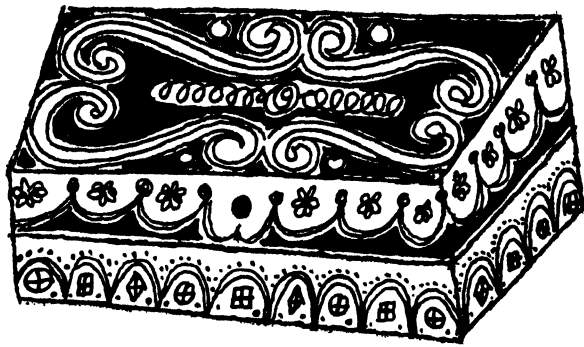
Sawdust also can be used for modeling small figures. Make a mixture of sawdust and paper hanger's paste the consistency of potter's clay and work it together in your hands. Make a core the size and shape you wish for the figure and allow it to dry. Details are made by moistening spots on the cone and adding bits of the sawdust mixture.



DECOUPAGE

This is a centuries-old art of making ornaments that can be applied in many ways to add charm to contemporary decorations. The process involved in accomplishing these grandiose effects is simple enough, but it requires endless patience and time on the part of the craftsman.

In general, découpage decorations are designs carefully cut away from the original background such as wall paper or old prints.



Skill in cutting is one of the requirements of the craft. First of all, cover the top of your design with clear lacquer and allow it to dry before the cutting. This not only makes the paper stronger, but sets the colors. A good design must be cut carefully, so use nail scissors for cutting around the curves. If you like, outline the edges with a color such as gold, silver, or black, and you are ready to apply the design.

Prepare the surface for the design, usually by painting a solid background with lacquer. The preferred color is an antique white, which is accomplished by rubbing on some burnt umber after the white coat is dry. Cover an area the size of your design with glue, lay the design on top, and straighten out all parts with your fingers. Allow it to set ten or fifteen minutes, then wipe away excess glue from around the edges with a wet sponge or cloth. Now the long process of hardening the surface begins.

Keep adding additional coats of clear lacquer, allowing each to harden in turn, until the surface is built up over the surface of the design. This will require eighteen to twenty coats, depending on the thickness of the lacquer. Smooth the surface with fine sandpaper and steel wool after each coat; then, at the last, give it several coats of wax.

14. SQUARE KNOTTING— a nautical craft

SQUARE KNOTTING is a most useful accomplishment, for there are so many things one can do with this comparatively simple technique. How or by whom the square knot was originated is not known, but sailors the world over have used it for ages for practical purposes and also for fashioning novelties in their spare time, during long voyages. There is a close relationship to the old-fashioned work known as macramé. This word—said to be Arabic—was used to describe ornamental braids and strips which grew to be elaborated into bags, table runners, and other decorative and useful objects. There is no reason, in the nature of it, why it could not be made in greater widths, but it is particularly suitable for belts, braids, and similar things.

In this chapter, which will serve to start you on your way as a square knoter, will be given only one example of its application—how to make square knotted belts. But, if you learn to do this, all things in the way of square knotting will be possible to you.

EQUIPMENT AND MATERIAL

Some device is needed to hold taut the two centre strands of cord around which the knotting is done. Figure 1 shows a piece of one-inch dowel with a hole through which a cord is passed to tie around the waist, and a notch on the diagonal for holding fast the two strands of cord, the foundation for your work. The second type is made from a block of wood about two and a half or three inches long, about two inches wide, and at least an inch thick. Bore holes opposite each other about half an inch from the edge

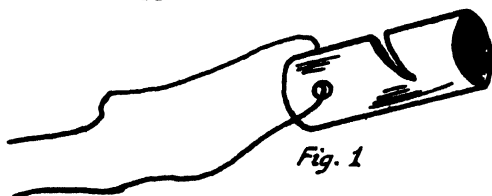


Fig. 1

on two sides. These carry the cord to tie around the waist. In the middle of the block put a large nail or a hook (curtain hook) that can be bent back so as to grip the two centre cords tightly. Get someone to hold your cord while you are getting started, then pinch it in a drawer, hook it over a peg, a nail, the bedpost, or whatever is convenient for you.

Cable cord (about No. 12), or unpolished seine twine of equal thickness both work up very well in square knotting. For some articles, as you go on with this craft, you may wish to use a finer ply cord, but it will be easier to master the principle by using the thicker strands to begin. A cord as heavy as No. 36 is suitable for a man's belt.

A pronged metal buckle can be used to finish a belt, or two rings or squares of metal or plastic lashed together with a leather thong. How to use either of these types of buckle will be described in detail later.

MAKING A SQUARE KNOT IN ONE OPERATION

Square knots are always tied in groups of four strands. To tie the knot, separate the first four strands on the left from the others, and hold the middle two taut as described above. Now take the fourth strand—the one on the right—and make a loop about two inches long. Place it on top of the two middle strands (the taut strands), holding the end of the loop with the right thumb and forefinger. Put the thumb and first finger of the left hand down through the top of the loop that extends over the two middle strands, and reach down and under the middle strands; catch the end of the loop where the fingers are holding it, and pull it through until it is tight. (Figs. 2, 3, and 4.)

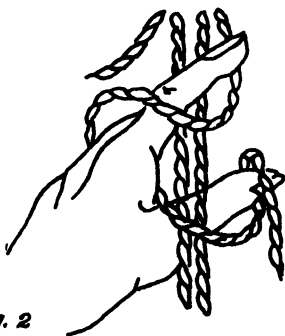


Fig. 2

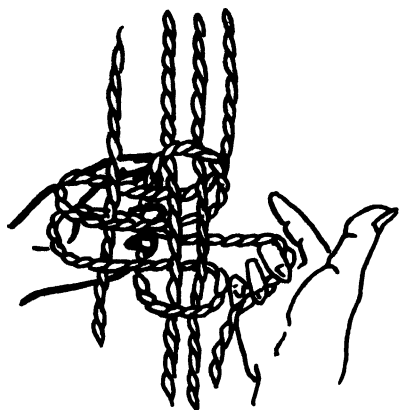


Fig. 3

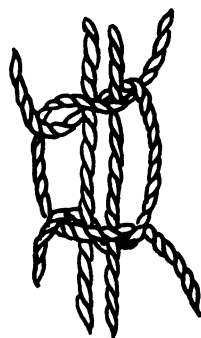


Fig. 4

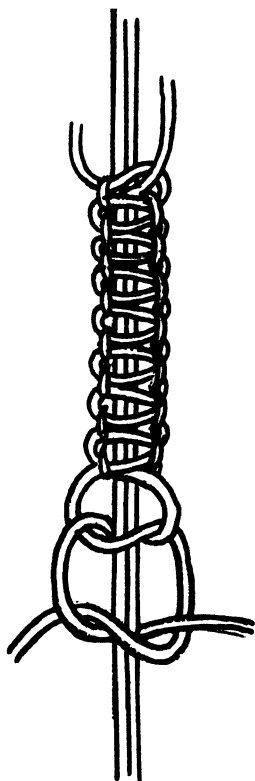


Fig. 5

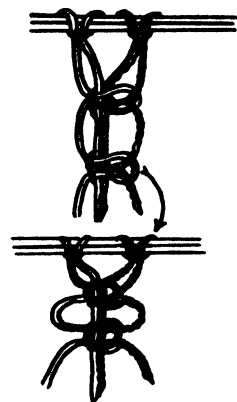
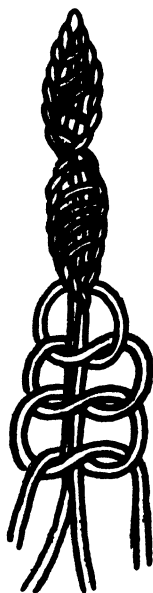


Fig. 7



Fig. 8

Now take the first strand, or the one on the left, and pull it all the way through the double knots. You are now ready to separate the two knots. Reach under the two loops with the left hand, take hold of the small loop underneath, and hold the long string on the right with the right hand. Pull back and forth until the knot is separated.

Take the cords below the first part of the knot and pull the first half of the knot up tight. Then pull the strings below the second part of the knot until it is tight against the first half of the knot. Practise the knotting until you have a clear picture in your mind of every step of the operation.

THE HALF-KNOT

In making patterns, a series of half knots is sometimes used. To make a half-knot, hold the two middle strands taut. Loop the right strand across them. Carry the left strand over the right one and under the two middle strands, then up and over the right strand again. (Fig. 5.) Pull it up and you will have your half knot. Figure 6 shows a pattern variation made by half-knotting several times with the right strand, and then several times with the left, resulting in a curl or spiral effect.

THE HALF-HITCH

What scouts and sailors refer to as the half-hitch is really the same principle as buttonholing. One strand is held out taut, another strand is carried under it, leaving a loop. Carry the end of the loose strand over the taut strand and down through the loop, drawing it up tight. The diagonal pattern in Figures 15 and 16 are examples of the half-hitch or buttonhole knot.

THE PICOT

Figures 7 and 8 illustrate the picot, another pattern variation. To make a picot effect, begin about half an inch from your last knot. Make a square knot at this point, then push it up along the taut strands to join the last knot you made. This will give you a small loop or picot on each side of the double strand.

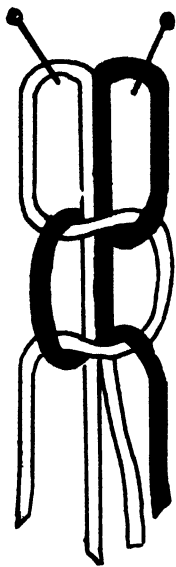


Fig. 10

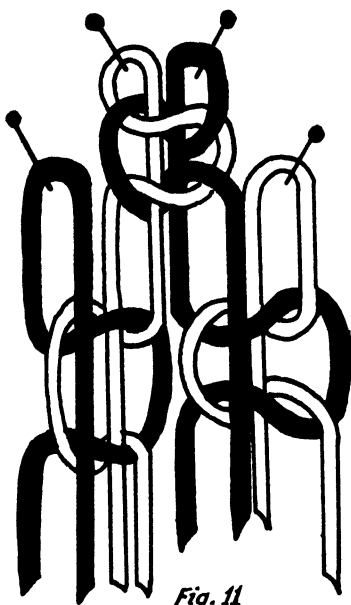


Fig. 11

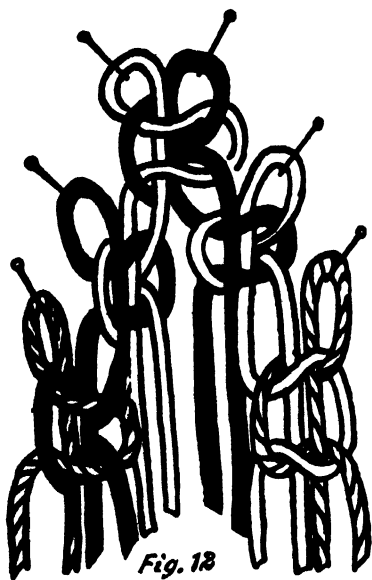


Fig. 12

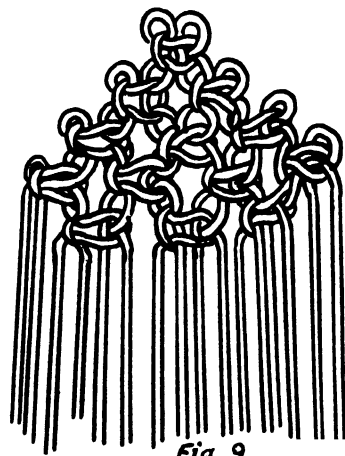


Fig. 9

MAKING A BELT

First, take the waist measure. For a plain belt you must allow three and a half times your waist measure for each strand, and, if you are using a pronged buckle, about three inches more to go through the buckle and "keeper." One end of the belt, however, must have loops, and at the other end the cords must be cut. The way to allow for this is to measure off *seven* times the waist measure (plus the extra inches), cut it off, and double it once. That will give you two strands of the necessary length—three and one-half times the waist measure. You need at least four strands for every knot, the width of the belt depending upon the number of strands and the ply of the cord.

Study Figure 9. We are going to start from this pointed "end" to make our first belt. This belt pictured has sixteen strands, or eight double strands, as explained above. You can have as many as you wish—the procedure is always the same. Set up the cords for the start as in Figure 10, each cord hooked over a nail or a peg. Fasten your two centre strands in the "holder." Make a square knot. Below this knot, to the left, hook another strand over a peg. Working now with the two new strands and the strands nearest them, make another knot. Do the same on the right side. (Figure 11.) Continue with the rest of the cord until you have the desired width. (Fig. 12.) Then go on with your belt, making whatever pattern you wish.

PATTERNS

All patterns arise from the sequences you use in your knotting. Once having mastered the initial technique, you can follow any pattern or devise patterns of your own. Figures 13, 14, 15 show different pattern possibilities, and the half-knot, half-hitch, and picot have been explained. With these you can make a great number of designs. One of the most interesting variations is explained below.

DIAGONAL KNOTTING

In Figures 16 and 17 are shown examples of attractive pattern variations by use of diagonal knotting. To do this you begin with the first strand on the left side. With each cord in succession make a half-hitch or



Fig. 13

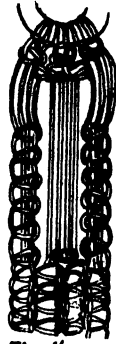


Fig. 14

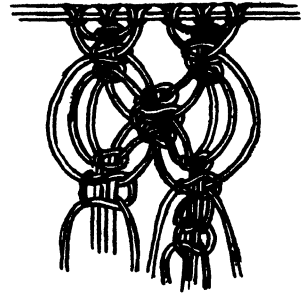


Fig. 15



Fig. 16

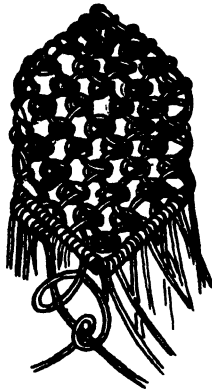


Fig. 17

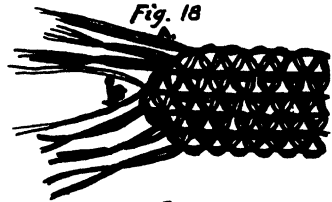


Fig. 18

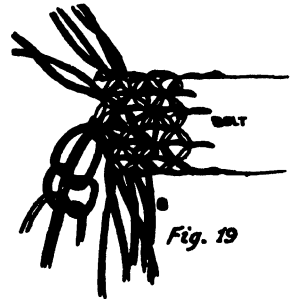


Fig. 19

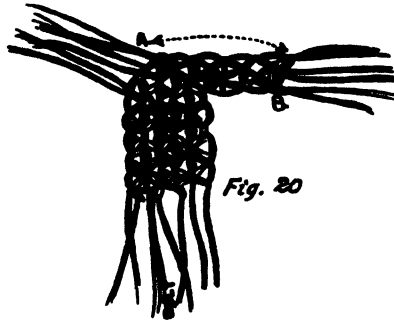


Fig. 20

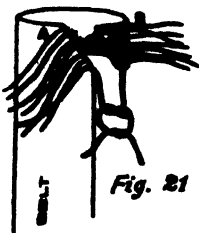


Fig. 21

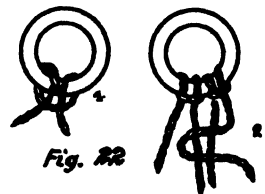


Fig. 22

buttonhole knot over the first strand, which must be held taut in the bias position. When you reach the centre strand, begin at the right side and follow the same procedure until you come back to the centre cord again. Make a knot with the two outside cords. Continue knotting, working from the centre towards the left; and then going back and working out to the right edge. As you see, this makes a very effective pattern.

FINISHING WITH A LOOP OR "KEEPER"

When your belt is long enough, and you are ready to make the loop, bring the centre to a point (Fig. 18) by dropping two strands at a time, until you reach the middle. Then divide your strands from the point as in Figure 19. Knot one side, as in Figure 20, working at a right angle to the belt, and bring these strands to a diagonal to form the belt loop. The point should be on the same side (the top towards you) as the point in the belt itself. Now (Fig. 21) bring the strands from this belt loop around, and knot them to the loose strands with square knots. This joins the belt loop to the belt. When you have made the final knots tight, cut off the strands and turn the belt loop inside out before putting the belt through the buckle. After finishing the loop or "keeper" and trimming the ends of the cords, use duco cement to keep the cord from fraying where it has been cut. Soaking the ends in water before cutting also prevents fraying. After each washing, put on some more cement.

BUCKLES

You can begin a belt at the buckle end, if you like. Figure 22 shows one way of doing this—by buttonholing your strands over the buckle. You can also start off by making several rows of square knots close to the buckle before beginning your pattern.

If you are using a pronged buckle and want to finish your belt with a point, bring the strands down to a centre by dropping two at a time, right and left, as described above. Then make about three rows of half-hitches on each side, soak them in water, and when they have dried, cut them off and use the cement.

If your buckle consists of rings without a clasp, you can fasten them together with a leather thong. Figures 23 and 24 illustrate this kind of fastening. Cut your thong ten inches long and about one-half inch wide at one end, tapering to one-quarter inch at the other. Cut a slit in the half-inch end,

pull thong through one ring, and draw the whole strand through slit, thus attaching it to the ring. To tie, place the two rings together, and pull the thong under the ring to which it is not attached, then up through it, over both, and down through the first ring. Again bring it under both and up through the second ring, over the top of both rings and down through the first one again. You now have two loops around the rings. Bring the thong up between the rings and over the double loops from top to bottom, and under the first ring again. Now bring it up through the first ring and over the top and under the loop just made between the buckles. Cord may be used instead of a leather thong. Attach it as shown in Figure 25.

In case you are using rings, having begun by looping your cords around one end, you will have to do the same when you come to the other end of your belt. Draw your strands from the back of the buckle to the front, then thread them down to the back again; turn buckle over and make a row of square knots on the under side, tight against the buckle. Soak the knots in water, dry, trim, and finish with a touch of cement.

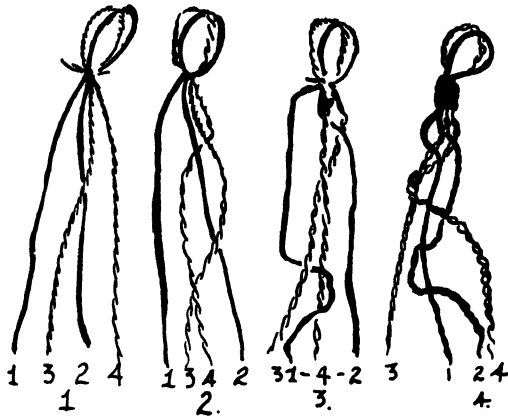
A BRAIDED LANYARD

Measure off as much cord as the finished length of your lanyard. Suppose it to be sixteen inches. You will need, then, for your work, two cords two and one-half times that length, or two pieces of cord or twine forty inches long. Double your two strands and tie the loop ends with a piece of string, so that they can be hooked over a nail or a peg while you are braiding.

The Braiding Process

Spread out the four strands and cross 3 over 2. (Fig. 23.) Next bring 4 *under* 2 and 3 and back *over* 3. Hold in place with left thumb and forefinger. Then bring 1 *under* 3 and 4 and back *over* 4. Again hold it in place with thumb and forefinger and continue braiding by bringing 2 *under* 4 and 1 and back *over* 1. Next take the outside cord on the left, which is 3, and bring it *under* 1 and 2 and back *over* 2. The braiding is continued by taking the highest outside strand, bringing it under the two nearest ones and back over the second one. In other words, the sequence is always under two strands and back over one.

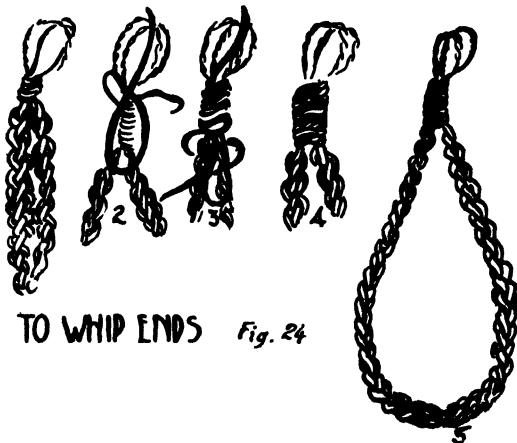
TO BRAID_ *Fig. 23.*



Whipping the Ends

When the braiding is completed, bring ends and loops together as shown in Figure 24. Remove the small string around the loops and ravel out one small strand; wind this strand around the lanyard above the loops, as in the first step shown.

Next cut a piece of braiding cord fourteen inches long. Make a three-inch loop at one end of it. Hold the lanyard in the left hand and lay the loop over the binding strand, the ends away from the loops of the lanyard. Begin winding the whipping cord as tightly as possible. Continue until you have a three-quarters of an inch or an inch whip, then thread the strand through the extra little loop. Pull it up close, then pull the ends of the small loop down half way under the whip. Cut both ends close to the whipping.



TO WHIP ENDS *Fig. 24*



15. THE HOOKED RUG

A RUG NEED NOT BE as literal as the one pictured above in saying "Welcome" to convey the idea, for hooked rugs have always typified the warmth of home and hospitality in a way all their own. This is natural, for it was their original intention. In old-time houses, the woven rag rug was made solely for floor covering with little regard for decorative value. If it happened by good fortune that the colours blended into a pleasing combination, that was all very well, but use was the chief consideration. The hooked rug, too, was definitely for use, but design entered into it, as well as the satisfaction of skilfully employing scrap materials and spare time. So rug hooking is a valid folk art, in every sense of the word.

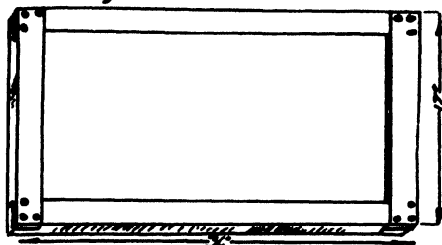
When house pride demanded something fine and special in the way of scatter rugs for parlour or guest chamber, the country housewife used to hook them on old burlap feed sacks from scraps of silk, cotton, or yarn, often working into her designs places or events which stood out in family or community life.

Rug hooking has many merits as a craft—it is light work, and can be picked up and laid down at any time without damage to the finished article; it is very simple so far as technique goes; it is inexpensive, and the results are gratifying in the matter of use and beauty.

EQUIPMENT AND MATERIALS

Some sort of frame is needed to hold the burlap tight and firm while you work. There are commercial frames to be had, but it is easy enough to make one if you have a few tools.

Fig. 1



FRAME

Fig. 2



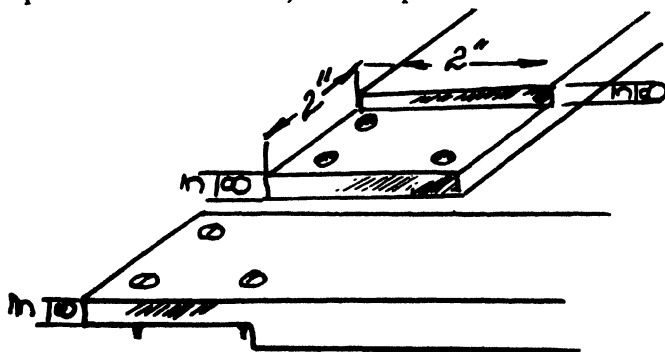
BURLAP ON FRAME

Use soft wood three-quarters of an inch thick and two or three inches wide. (Fig. 1.) The frame on which the illustrated "Welcome" rug was made was 36" long by 17" wide; the wood was two inches wide and three-quarters of an inch thick. This size is small enough to be held comfortably on the lap when working. You can use a smaller size and make "patches" to be sewn together. A fairly good sized frame is practical, however, if you are having only one, for you can use only part of the burlap if, for instance, you want to make oval or circular rugs or chair seats. (Fig. 3.)

For the filler, carpet rags, rug yarn, old silk stockings, silk or woollen rags, chenille, and candlewicking are all good materials.

If you plan to use yarn it will take approximately eight ounces to the square foot. Rug hooking is one of the best ways to utilise yarn scraps, although to make a rug of any considerable size you will need a great many. But when you start collecting, you will find that almost every knitter and crocheter has many odds and ends of yarn for which she has no use.

If you are going to work with old or new fabric—silk or cotton—it must be cut into one-quarter to one-half inch strips (Fig. 4) and rolled into balls (colours separated for convenience). The strips need not be continuous, so do



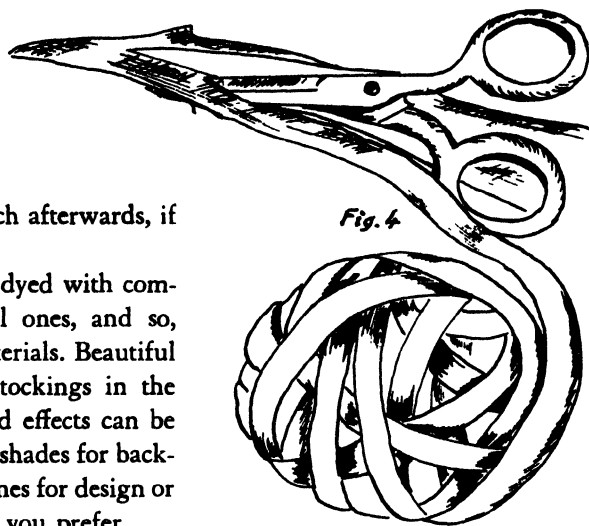
DETAIL OF CORNER

Fig. 3

not sew your pieces together. Prepare all your material before you set to work, for colours are hard to match afterwards, if you run short.

Silk stockings can be dyed with commercial dyes or natural ones, and so, of course, can other materials. Beautiful rugs can be made of stockings in the original shades. Splendid effects can be had by using the darker shades for background and the lighter ones for design or the other way round, if you prefer.

If you have materials to be dyed, send for Home Dyeing and Natural Dyes, Government Bulletin 230, U. S. Department of Agriculture, Washington, D. C.



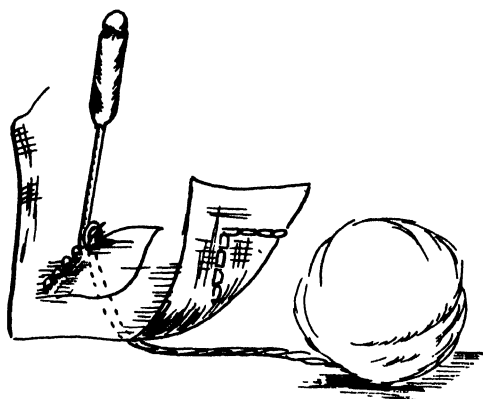
DESIGN AND TECHNIQUE

Draw the design for your rug with coloured crayons on wrapping paper. This will give you a working chart for colour distribution. It will also give you an idea of how much of each colour you will need. Transfer the design to the burlap, freehand if you are sure of yourself, or with transfer paper.

A pictorial design—something related to your own experience—is the ideal thing for a hooked rug. One very modern home-maker who is also an artist made a set of stair pads for the open staircase in her century-old house. Each pad has a picture of a neighbourhood scene or an event in her life: the covered bridge nearby, the church where she was married, the Christmas carolers who came the first year she lived in the old house, the dinner bell that still summons farmhands and children. The “Welcome” rug illustrated in the chapter heading is a real rug made by a young “model” farmer when he was laid up with a broken leg. The work helped him through the long weeks of inactivity, and the finished product was a surprise for the bride he brought home the following spring.

Perhaps a geometric design or a floral piece would be more to your taste. Elsewhere in this book you may find an idea for a start, if you have nothing

as appropriate for a rug



DETAIL OF LOOP
Fig. 5

A point to remember is that in beginning your hooking you first outline your entire pattern with the chosen colours. Unless you do this, the traced design may rub off a little and you are likely to get a fuzzy pattern instead of a clear one. It is also easier to blend the colours if you get your outlines first. The background can be filled in after you have hooked around the outlines, or it can be left to the last, if you wish.

The hook (Fig. 5 and Fig. 6) is used to pull up a series of loops from the back of the burlap. There is also another kind of hook on the market which is used to hook from the underside and in using this you work entirely from the back. If you want a fluffy rug, have loops three-quarters to an inch on the upper side and clip them after the rug is completed. If you want a firm surface, have quarter-inch loops and leave them uncut. Regulate the length of the loops with your hook. The "underside" hook has a gauge for this purpose. You can get a sculptured effect by trimming off the loops irregularly with those forming the design left longer than those of the background and graduated to emphasise the pattern. In hooking, follow the weave of the burlap, going into every other hole; this will give you a close, even surface.

The method for beginning or ending strips depends upon whether you are going to clip the loops or not. When you intend to shear them, leave the ends on the top side; when they are to be uncut, hook the ends through to the underside and tuck them under several stitches, sewing them down so that they won't shake out. The back of the work should be as neat as possible. The very best work is reversible.

Finish the rug by removing it from the frame and turning the remainder

of the burlap underneath to form a hem with mitred corners. Another way of finishing is to cut the burlap so that it will have a one-inch edge to turn under, with mitred corners. It must then be basted around the edge and lined with denim, canvas, or other suitable material. The lining should come to within half an inch of the edge of the rug; use a "blind stitch" to sew it to the upper side.

The finished rug should be firm in texture and it should lie flat on the floor. It is bound to do so if you have followed these simple directions. Hooked rugs are long-lived. If you make a good job of yours it will stand wear and tear and the necessary cleanings and washings, and you or the lucky one for whom it is destined will be enjoying it for many a year.



Fig. 6

HOOKEED WORK
YARN OR FABRIC
ON BURLAP

16. GAMES and puzzles

THERE ARE SO MANY BOOKS to be had on all the skilled games that we are not going into them here. Almost everyone in the process of growing up has had a phase of ardour for checkers, chess, backgammon, or one of the historic favourites; they need neither recommendation nor description.

But it is useful to know a few easy-going games requiring absolutely no thought, which are, nevertheless, fun for several people who enjoy "company" but want to be relieved of conversation or the need for concentration. If you want to make them more exciting you can put up pennies or what-have-you. Before you reach this stage, however, you will have to make your game.

There is one called "Match-it" which is the last word in simplicity of construction and of playing, but it can be very lively.

To make this so that six people can play, you will need a piece of five-ply fir wood six inches wide by twelve long. (Fig. 1.) Divide it into six blocks two inches by six, using a small saw. Smooth off your blocks with sandpaper and add any fancy touches which appeal to you. Down the centre of each block paint a half-inch stripe of bright colour (a different colour for each block.)

Half an inch from the long side edges bore holes large enough to hold a golf tee, a match stick, or a peg whittled from a piece of dowel, eight holes on each side. (In all the boards we describe we recommend the five-ply wood because you can have deep enough holes to hold good-sized pegs, easy to handle and they won't fall out and spoil the game.)

To paint the stripes you can use oil paint, enamel, or crayon. You will need to shellac your blocks, (after smoothing them off). Then give them another sandpapering. This treatment will prevent your colours spreading in the absorbent wood. If you use crayons for colouring, mark your stripes clearly first, and then put a little linseed oil on a cloth and rub over it. This will soften the wax of the crayon and it will penetrate just enough. Give the

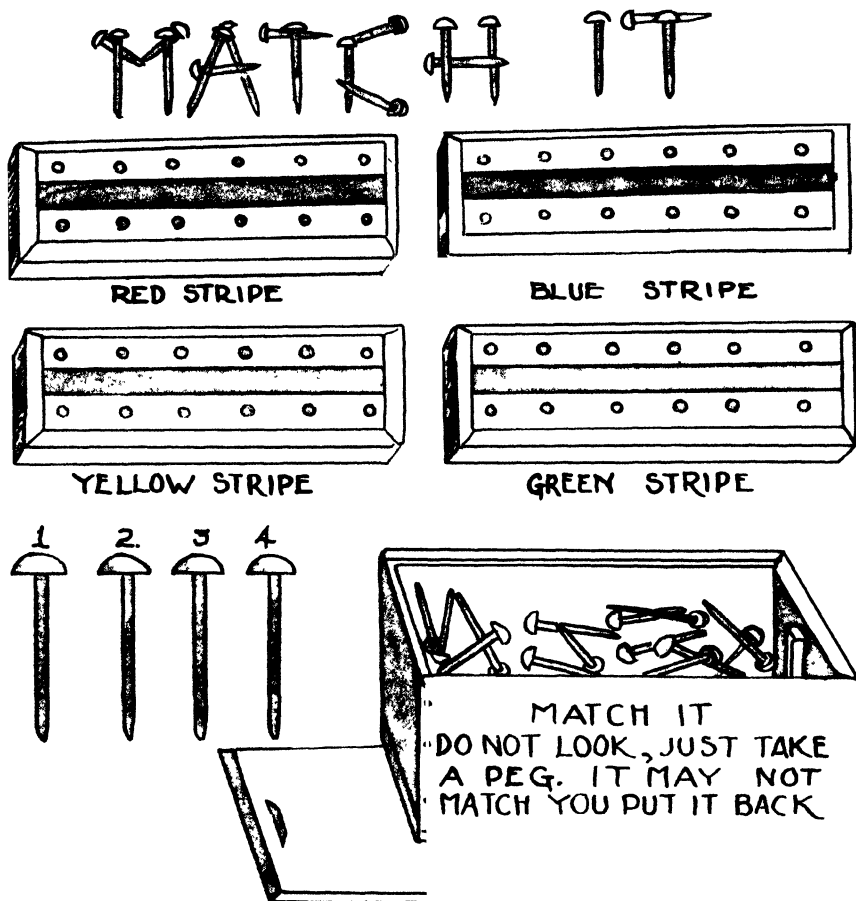


Fig. 1

blocks a final shellacking, sandpaper again, then wax and polish for a good finish.

Golf tee pins come in two colours, so you will have to touch up the others with enamel to match the stripes on your boards. You will need sixteen tee pins or pegs for "Match-it" for each participant. Make a box to accommodate the boards and pins, if your ambition carries you so far, but if not, get a deep box that will hold them all.

The rules of the game are very elementary. Leaving the pegs in the box, each player in turn draws "blind." If the peg top matches the stripes on his board in colour, he puts it in, and gets another draw. The drawing goes round

to the left, and the one who fills his board first is the winner. You can have an odd peg with a black top and if anyone draws this he can be penalized one man; and another with a white top which gives him two men and an extra draw.

A handy father or uncle could make a set of these, as a gift for a young relative, with a box to match—slide cover, perhaps, and initials on the lid. Very few tools are required: a saw, a scout knife or other good cutting blade, a foot rule, and a little sandpaper and shellac.

The same peg-in principle, as illustrated in Figure 2, is useful for many games usually played with counters or pieces which slide over a board. If your wood is sufficiently thick, you can make a face on each side of the board. You can also bore holes around the edges of the board to hold the pegs when not in use. But if you are fond of games, the best thing to do is to make a base board.

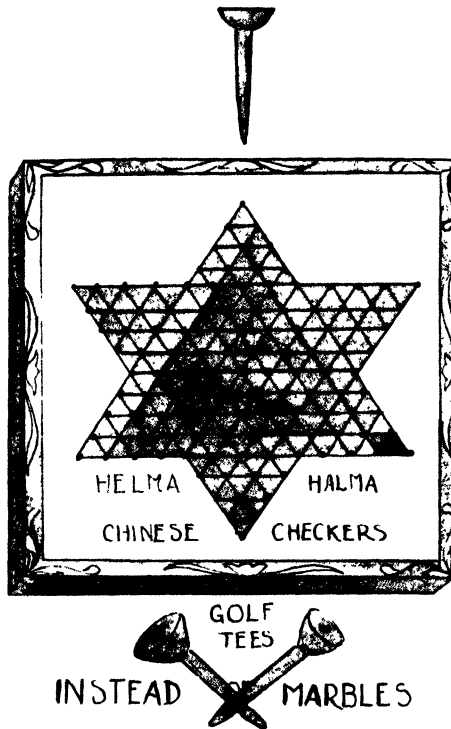


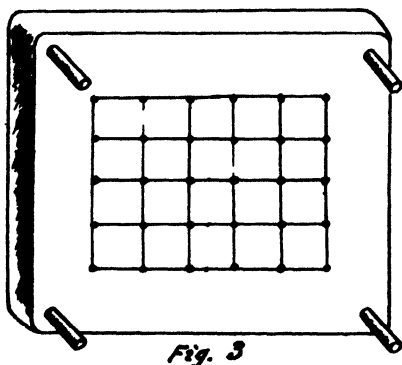
Fig. 2

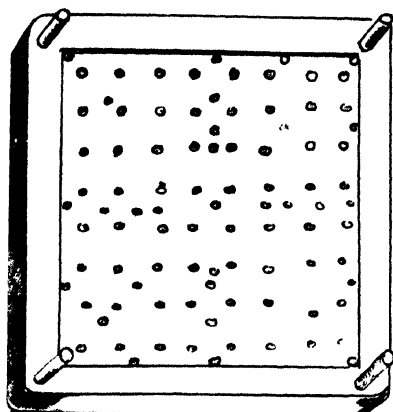
HOW TO MAKE A BASE BOARD

A six-by-six base board can be made so as to serve for all games of this type. Measure off the five-ply fir wood, or have it cut for you at the lumber yard. Sandpaper it, rounding the corners if you want to give it a professional touch. Give it a light coat of shellac and another sandpapering. (This is classic procedure for many kinds of small woodwork.) Now measure it off into half-inch squares, and draw lines. Where the lines intersect, bore holes deep enough to hold whatever size peg you are going to use. Many games are played on squares, so this is the best way to mark off your base. Your first holes should be one inch from the corners of the board. Half an inch from every corner drill a deeper hole, wide enough to take a quarter-inch dowel. Five-ply board comes in different thicknesses, but it should be at least half an inch thick for a base board. Assuming that you will use half-inch wood, have your dowel one inch long so that it can be glued well down into the holes and protrude half an inch.

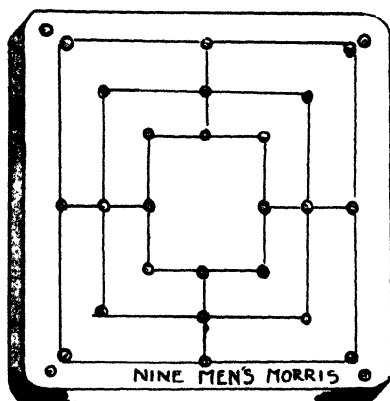
From strong cardboard or beaver-board, make several squares, six-by-six, with holes drilled one-half inch from each corner. These will fit over the projecting dowel pegs. On the face of these boards draw and paint in with oil colours or crayons, as described before, outlines for any games that appeal to you. You can thus have the equipment for several games, taking up very little room, and convenient if you are travelling or living in small quarters. (Figs. 5, 6, 7, 8, and 9.)

As you add "face" boards, you will have to bore additional holes in the base board, to take the pegs. Fit each face over the projecting dowels, and then make the extra holes necessary in your base for the new game. It will eventually resemble Figure 4, but it will hold up for a long time.





KEY BOARD *Fig. 4*



NINE MEN'S MORRIS *Fig. 5*

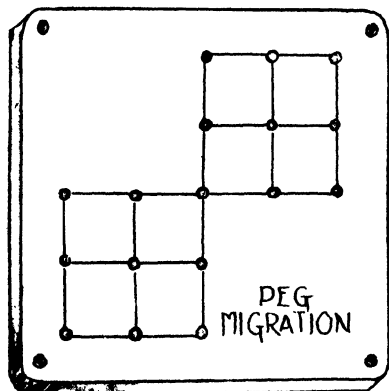


Fig. 6

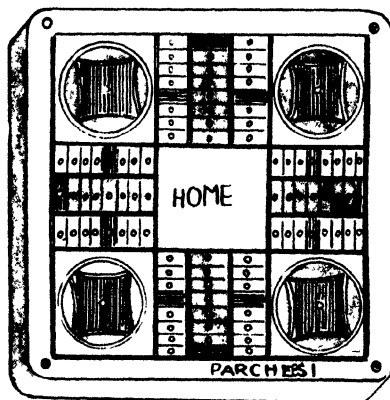
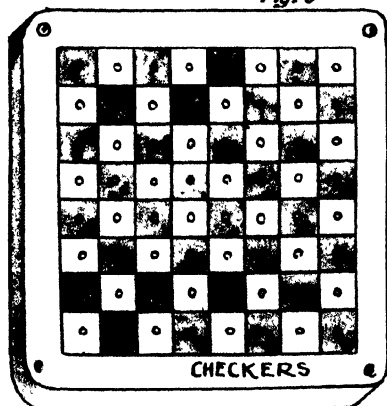
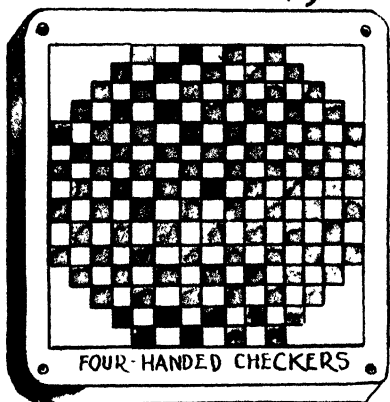


Fig. 7



CHECKERS



FOUR-HANDED CHECKERS

NINE MEN'S MORRIS

In case you have never played Nine Men's Morris (face of board is shown in Figure 5) we will give the rules. It is an ancient game, said to have been played in Egypt 3,300 years ago. On the roof of the Temple of Kurna, which was begun by Rameses I, is cut the diagram of a morris board.

Each player has a set of nine men, the sets being of different colours. The object is to capture seven of the opponent's men.

Start with an empty board. Players take turns placing men, aiming to make rows of threes (no diagonals at corners allowed). A player who succeeds in forming a row of three may "pound" any of the opponent's men by way of bonus. A row of three cannot be touched while there are other men of the same colour on the board, although a player may open his own row if he likes. When all the men have been entered, players in turn move their men along open rows attempting to get three in a row. The same man may not be moved twice in succession, but any row of men may be opened and closed as often as desired, provided the foregoing rule is observed. When a player is reduced to three men, he is at liberty to hop all over the board and need no longer follow the lines. When either player is reduced to two men, he has lost the game.

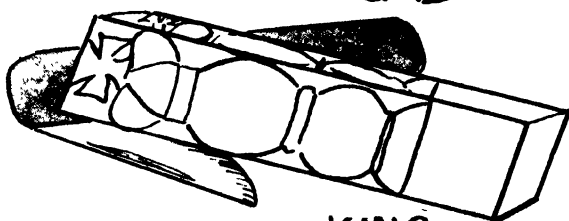
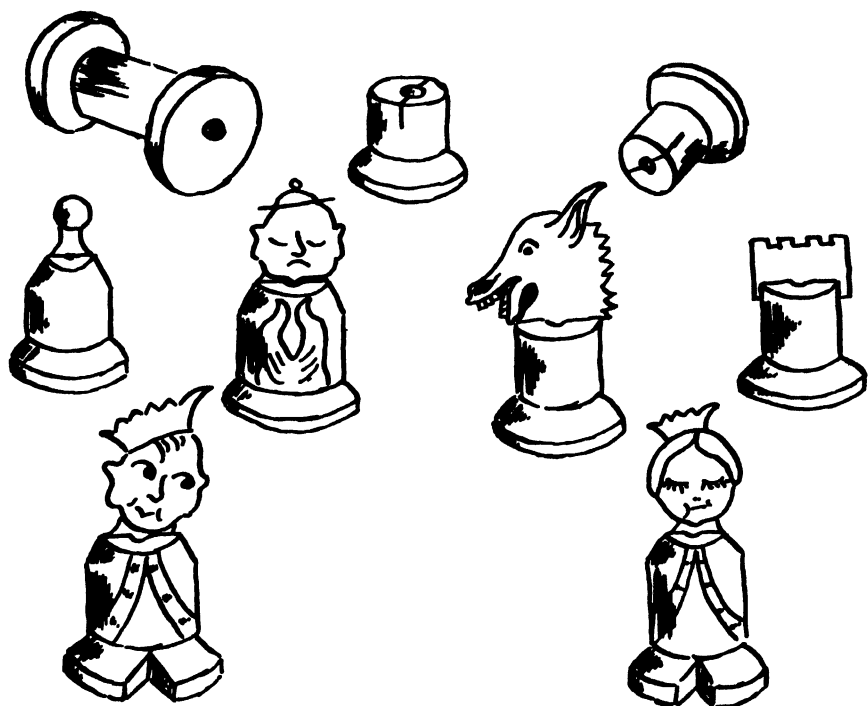
This game has had a persistent appeal and, under local names, it has been played in such far-apart places as Egypt (in priestly circles, as we noted before), Iceland, the Amazon, and in all the European countries. It is cut on the steps of the Acropolis at Athens and into the choir stalls of several English cathedrals. It can be played out of doors on a large field and it is a very lively game, indeed, when laid out in the open.



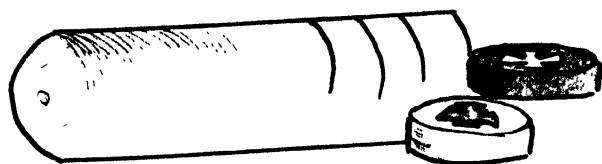
MAKE YOUR OWN "MEN"

Figure 10 shows a set of chessmen made from spools with cardboard head-pieces for identification. If you are a whittler, you can make them of wood. Sugar pine is a good soft wood for whittling, and it has no knots. A good size for making chessmen is 2 x 2. Draw the figures on all sides of the block,

CHESS



KING
FROM A
14" SQUARE



CHECKERS
FROM A
DOWEL

either freehand, or by using transfer paper. A good penknife is the only tool you will need. (For detailed instructions in whittling see *Arts and Crafts, A Practical Handbook*, by Marguerite Ickis, New York: A. S. Barnes & Company: 1943.)

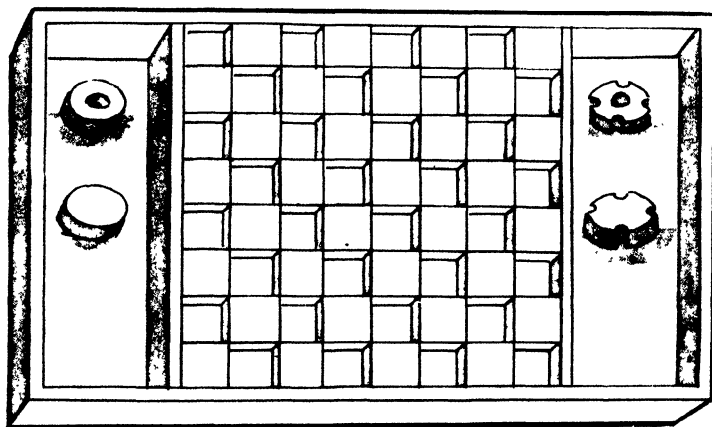
Checkers can be made of one-inch dowelling or smaller, if you are using a small board. One set can be finished in natural colour and the other painted.

Both chessmen and checkers can be made to be pegged in, for use in travelling, or if you should be likely to play on an unsteady surface. If you make peg-in checkers, make special pieces for kings with a thumb-tack for distinction, or another colour.

Figure 11 illustrates a chess and checkerboard especially designed for the blind or those with defective vision. It can be made in any convenient size. Three-ply wood is suggested for this board, as the alternate squares are raised; rule off the wood, stain it, saw it into squares, sandpaper and shellac, and then glue the little squares into their proper places on the board, or nail them on if you prefer. Notice the troughs at each end of the board to hold the men. One set of men has a smooth finish, the other set is notched. A string or elastic band will distinguish one set of chessmen. Make the board with hinges through the middle, to fold over and clasp, or with a lid which fastens over it so that the two sets of men can be kept in the troughs.

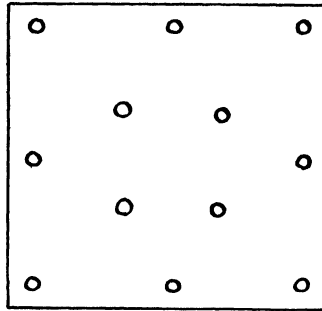
Dominoes, too, can be made for the blind by using tacks for the dots on the dominoes or by boring holes in them. Whichever way is chosen, the numbers must be tacked or bored in before cutting the sheet of wood. Use half-inch ply for these dominoes.

Fig. 11



CHECKERS FOR THOSE WHO CANNOT SEE

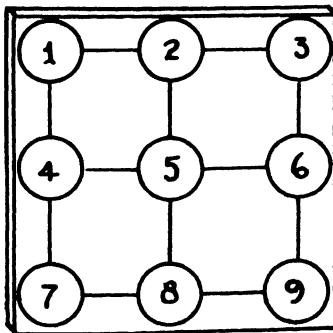
PUZZLES YOU CAN MAKE



PUZZLE

Fig. 12

All you need for this is a piece of paper, a pencil, and a scissors. Cut the paper into a square and mark twelve circles as shown in the illustration. THEN: Cut the paper into four pieces of equal size and the same shape, so that each will contain three circles—without, of course, cutting into any of the circles. If you can't make it, turn to page 299 for the solution to this and the other puzzles given here.

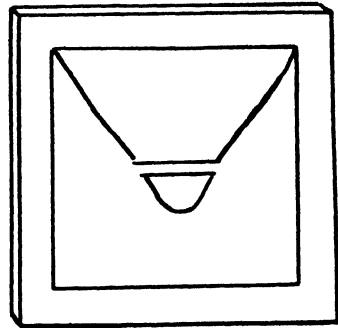


PUZZLE

Fig. 13

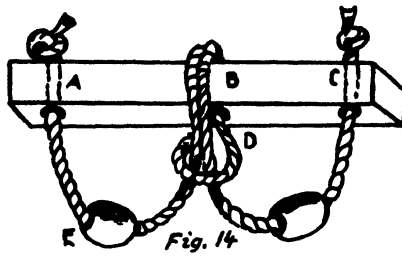


DISC

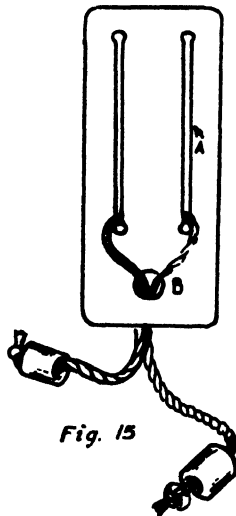


ENVELOPE

You can use this one over and over again to trip up your visitors and friends, so make it of cardboard. Cut a square any size and mark on it nine circles as illustrated. Then cut out nine discs and number them from one to nine. Paste an envelope on the back of your cardboard to hold the discs. The problem is to place the discs so that any line of numbers added together will give the same total.



Bore three holes in a strip of wood four inches long. Take a piece of cord or twine twelve inches long, find the centre and loop it through the hole marked "B" in the diagram. Pull both ends through. String a bead on each end, pass ends of cords through holes A and C, and knot. THEN: Get both beads in the same loop without removing cords from holes or untying the knots.



For the puzzle shown above you will need a piece of leather four and a quarter inches long by one and one-half wide, seven inches of cord, and two beads. Make two parallel slits in the leather. Cut out a small circle of the same diameter as the distance between the slits. Pass cord under slit, and thread both ends down through the hole. Fasten a bead on each end of cord. THEN: Get the cord out without removing the beads.

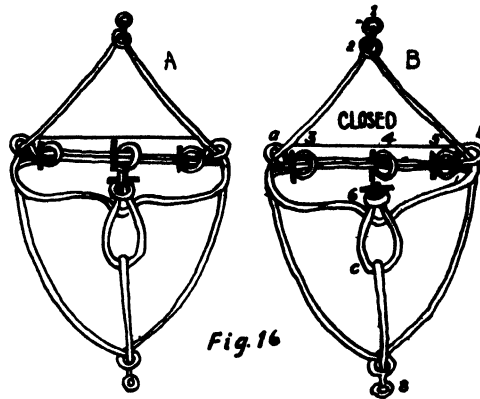


Fig. 16

With a piece of morocco, or any other suitable material, make a purse similar to the one shown above. The puzzle is to open it without removing any of the rings.

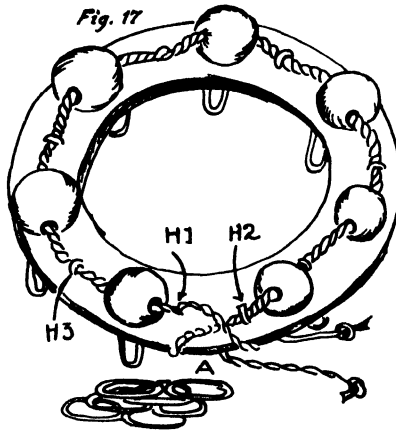
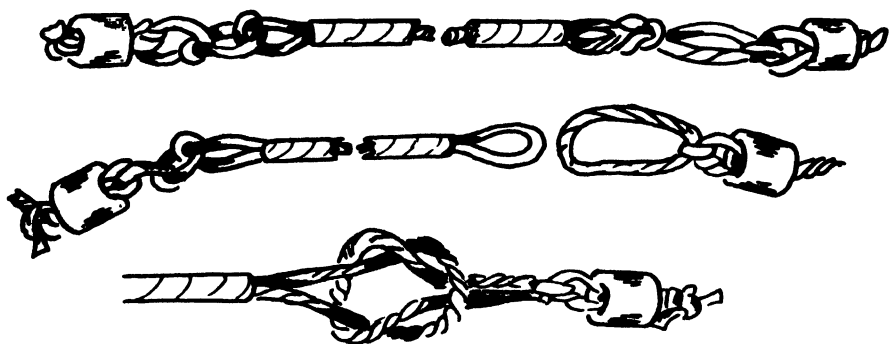
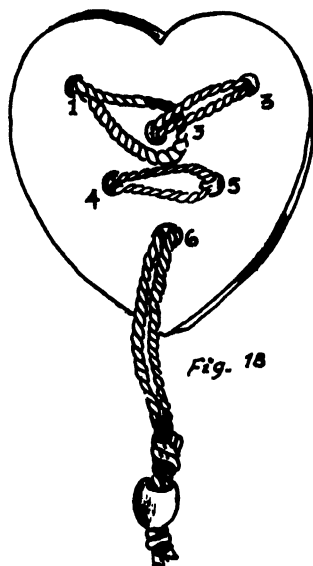


Fig. 17

Make a round frame three inches in diameter from cardboard or wood. Cut holes, two closer together than the rest, as shown above. Thread seven beads on cord and push them within five inches of end of cord. Put this end down through H, so that three and a half inches remain hanging under frame. Spread beads along cord around on top of frame with one bead between each hole. Bring cord over outside of frame at A. Thread on a curtain ring and bring cord up through H₃, over cord on which beads are strung and back down H₃. This holds each bead fast. Continue threading on curtain rings in the same manner until you have a loop over each hole. Bring cord up to H₁, cross it over to the right and under frame to form a cross. Tie two ends underneath. THEN: Exchange beads with rings without untying cord that keeps them in place.

Cut a piece of thin wood in heart shape, two and one-half inches high, and make six holes as in illustration. Double a twelve-inch cord or twine and run the two ends through a large bead, making knots as indicated. Pass loop end down through hole 6 from face to back, up through 2, and then through 3, 5, 4, and 1 in succession; down through 2 and down back to 6. Bring it up through 6 to face and pass it over bead. Draw loop back again through 6 and 2. THEN: Take bead and cord from heart without untying any knots.



SODA STRAW

Fig. 19

This requires a drinking straw, a cord six times the length of the straw, and two beads. Cut off two-thirds of the cord, fold it in half, and thread it through the straw, leaving a loop three-quarters of an inch long at one end, as in Figure 19-B. Tie two square knots one-half inch apart at the other end and attach bead, then make a knot to hold it. Take the shorter piece, fold in half, and attach it to the loop. This makes a slip knot. Tie another knot half an inch above and attach the second bead. THEN: Remove straw from cord without cutting cord.

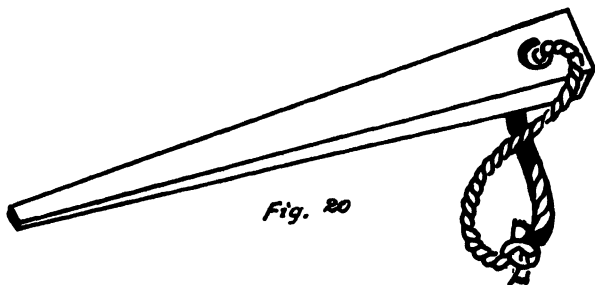
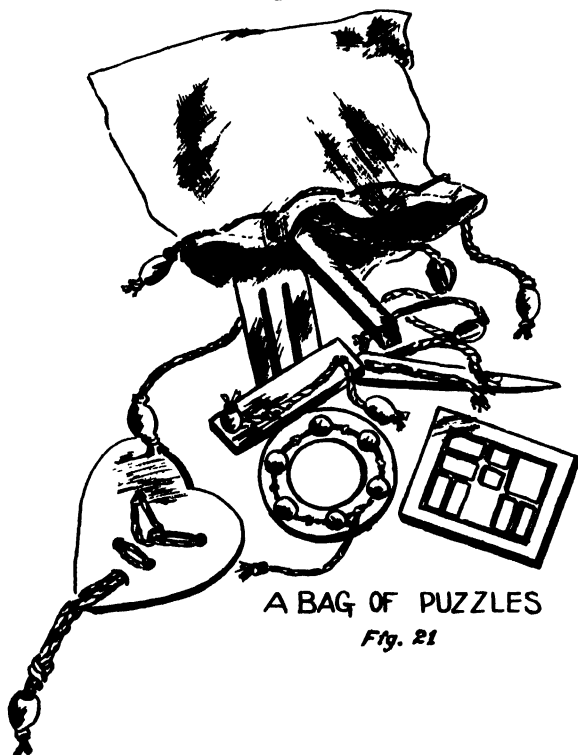


Fig. 20

Whittle a piece of wood four and a half inches long into a shape like the diagram. Drill a hole near the top and thread a five-inch cord through it, then knot the ends together. The loop must be more than half as long as the stick. Loop the stick through a lapel buttonhole by pulling the lapel through the loop until the point of stick can be put into the buttonhole. THEN: Remove the stick without untying the cord or cutting the cord or stick.



A BAG OF PUZZLES

Fig. 21

Make a game and puzzle kit to hold some of the game gadgets you construct. Eight by ten would be a good size to accommodate a half dozen or so of the things described above.

17. A BUNDLE of tricks

THERE ARE SEVERAL SCHOOLS of thought in the matter of card tricks and similar pastimes. There are those who can't endure them, however ingenious, and who settle back with a groan whenever a guest, with a light in his eyes, picks up a deck of cards and says something to this effect: "I'd like to try something on you that's really good—no one has been able to guess it to date—what do you say?" Well, what can one say? However, there are always some in a company who have a naïve interest in novelty of any kind, and who are always eager to sit in on an exposition of this sort and display their nimble-mindedness.

Out of the archives we have taken a few tricks with cards, dominoes, and numbers, dusted them off, and found them to be really interesting. The card tricks which depend for their confusion on the "long card" or the "forced card" we have left to their slumbers. But there are a few which are really fun even for a person who does not usually enjoy tricks. We have also tucked in a few good "magic" stunts requiring only easy properties. You will enjoy working these out yourself without an audience, and you can try them on your guests after you have got your own wits sufficiently sharpened and have developed (if need be) the showman's patter which is a proper accompaniment of any good trick.

TRICKS WITH CARDS

The Queens Dig for Diamonds. Taking the pack in your hands, separate from it the four kings, queens, knaves, aces, and also four common cards of each suit. Then, having laid the queens face upwards in a row upon the table, you commence telling your story, something like this:

"These four queens set out to seek for diamonds. (Here you place any four of the common cards of the diamond suit half over the queens.) As they intend to dig for diamonds, each takes a spade. (Here lay four common spades over the diamonds.) The kings, their husbands, aware of the

risk they run, send a guard of honour to protect them. (Place the four aces half over the spades.) But, fearing that the guard of honour might neglect their duty, the kings resolve to set out themselves. (Here lay the four kings half over the four aces.) Now, there were four robbers, who, being apprised of the queens' intentions, determined to waylay and rob them as they returned with the diamonds in their possession. (Lay the four knaves half over the four kings.) Each of these four robbers armed himself with a club. (Lay four common clubs half over the four knaves), and as they did not know how the queens might be protected, it was necessary that each of them carry a stout heart. (Here lay four common hearts half over the four knaves.)"

You have now exhausted all of the cards with which you commenced the game, and they are ranged in four columns. Take the cards in the first of these columns and pack them together, beginning at your left hand, and keeping them in the order in which you laid them-out. Having done this, place them on the table face downwards. Pick up the second column, proceed in the same manner, and so on with the third and fourth.

The pack is then handed to the company, who may cut them as often as they choose, provided they cut whist fashion. This done, you may give them what is termed a shuffle-cut; that is, you appear to shuffle them, but really you only give them a quick succession of cuts, taking care that when you have finished this flourish, a card of the heart suit remains at the bottom.

Then lay them out again as you did in the first instance, and it will be found that all the cards will come out in their proper order.

A GOOD GAME OF SOLITAIRE

This is a variation of the game of Canfield. It can be played by one or more players. Lay out the cards as in Canfield, that is: Seven across the board, left to right, the first face up, the rest face down. Then begin with the second row, laying the first card face up, and the rest face down. Continue until you get to the last row, when you should have seven cards face up, and if you count the piles left to right, there will be one card in the first row, two in the second, etc. You play them out by building down on the columns and up on the aces, which are put above the columns, as in Canfield, except that you play by suits. For instance, if there is a ten of diamonds turned up on any column, you will have to play the nine of diamonds there, then the eight and so on. The object is, of course, to get as many cards out as possible and to build up the suits on the aces.

A CARD TRICK WITH A MATHEMATICAL BASIS

When you demonstrate this, it is necessary to keep talking so that your mathematically minded friends will not catch on to it too quickly.

Shuffle the cards well. Be sure that you have a standard pack of fifty-two cards, a bridge deck, without joker or any other extra card. You may invite one of your audience to shuffle, if you like. Then begin to lay out the cards face up in piles, thus: If the first card should be a four, of any suit, it makes no difference, begin counting (to yourself) with "four" and lay out cards, continuing to count silently until you have reached thirteen. Then begin another pack. The knave is counted as "eleven," the queen as "twelve," and the king as "thirteen." Now, turn the packs over, giving a glib reason for doing so. If there should be an odd pile which will not count up to thirteen, say something to this effect—"we shan't need these for the moment, but they'll come in useful later on." Now, supposing you have five or six piles, face downward on the table. Invite your audience to select three packs to work with. Pick up the remaining packs and put them with the odd cards which you have put aside. Let one of the onlookers turn up the top card of two of the packs and then you can tell them what the top card of the third pack is. You arrive at it thus: Suppose a four and a queen are turned up. The queen counts twelve, twelve added to four makes sixteen; to this (or whatever is the sum of the two upturned cards) you add ten. Say that we have now twenty-six (all of course in your head, while you continue to talk). Take the pile of discards, shuffle them, and rapidly (to yourself) count twenty-six, turning them up as though you were looking for something. When you have counted twenty-six, begin at one and count to the end of the pack. If you should have, say, eleven cards left, the concealed top card on the third pack will be a knave. Manœuvre it so that the thicker packs are selected to work with, for, if there were only one card it would have to be a king, and if there were three, it would be a knave, and this would make it easier for the audience to catch on.

THE DOMINO ORACLE

This trick, to one not familiar with it, is certainly surprising.

Arrange twelve dominoes as shown in the illustration, and tell anyone present that if he will think of one of the dominoes and remember it, you will point it out to him. Now, supposing the double-deuce is the domino selected; you tell the person who has made the choice that you will count

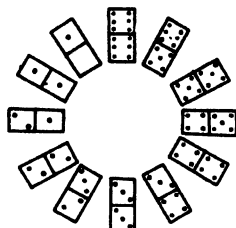


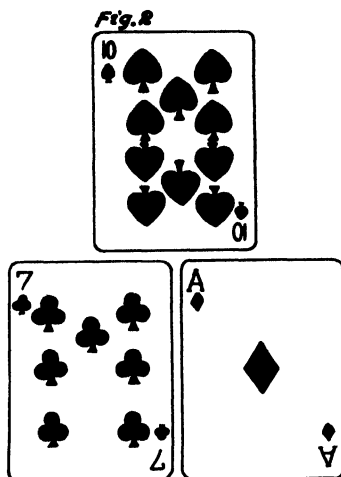
Fig. 1

around the circle and when you have counted twenty, including the number of spots on the selected domino, he must tell you to stop, and that your finger will then rest on the domino chosen. The secret is this: You count carelessly around, 1, 2, 3, 4, 5, 6, 7, on any of the dominoes, but at the eighth count you always manage to point to the double-six, and after that you continue counting around *regularly to the right*. Be sure you remember this, for it is the key of the trick. For example, as we have said before, we will suppose the double-deuce to be the chosen domino. We know the above instruction, and count and point at the dominoes promiscuously the first seven counts; but at the eighth count, we point at the double-six, and then continue to the right on the six-five, double-five, and so on in succession until we arrive at the double-deuce where we will be told to stop, because by that time we will have counted sixteen, to which if we add the spots on the domino selected we will have twenty. This rule holds good no matter which domino happens to be selected. It is, perhaps, needless to say that you must not count out loud nor appear to be counting mentally, but let it seem as though you are only pointing at the dominoes at random. You must let the person who selects the domino do all the counting.

TO GUESS THE TWO ENDS OF A LINE OF DOMINOES

Let a set of dominoes to be shuffled together as much as any of the company may desire. You propose to leave the room and assert that from your retreat you will be able to tell the two numbers forming the extremes of a line composed of the entire set laid out according to the rules established for laying one domino after another in the draw game.

All the magic consists in taking up and carrying away, unknown to anyone, one domino (not a double) taken at random. The two numbers on it will be the same as those on the end of the two outer dominoes. Your experiment may be repeated ad infinitum, by taking each time a different domino, which, of course, changes the numbers to be guessed.



THE THREE PACKETS

Tell someone to choose as he pleases three cards from a euchre pack, informing him that the ace counts for eleven, the picture cards ten and the others according to the number of spots. When he has chosen three cards, tell him to put them on the table, and to place on each as many cards as spots are required to make fifteen. That is to say, in the example, eight cards would have to be put on the seven of clubs, four cards on the ace, and five above the ten. Let him return to you the rest of the pack and (while pretending to examine them) count how many remain. Add sixteen to this number and you will have the number of spots in the three bottom cards, as may be seen in the example, where twelve cards remain, to which number add sixteen and the amount (twenty-eight) is the sum of the three cards.

LIKE WITH LIKE, OR HOW TO KEEP A HOTEL

Pick out all the aces and picture cards, and then place any ordinary card upon the table. "This card," you say, "we will call a tavern." You commence your story as follows:

"On a dark night there came four farmers to this tavern and asked for a night's lodging. As none of the landlord's rooms were occupied, and as he had four of them, he showed each of the farmers to one of the rooms, and went quietly to bed. (Here you place the four knaves around the card which represents the tavern, and proceed.)

"Not long afterwards, four police officers knocked at the door, and requested also a night's lodging. As the landlord now had no chamber un-

occupied, he put an officer in with each of the farmers. (Here you place the four aces upon the four knaves.)

"Presently four fine gentlemen came along and they, too, wanted a night's lodging. Our host was now in great embarrassment, but there was nothing left for him to do except to put a gentleman in each of the four occupied chambers. (Here you lay a king upon each ace.)

"Thus far matters went tolerably well, although not meeting with general approbation; but now came four fine ladies who also had to have a night's lodging. The landlord was now beside himself with perplexity. Indeed, he fairly lost his senses, for the stupid fellow actually quartered a lady in each of the already occupied chambers. (Here you place the queens upon the four other cards.)

"The ladies were highly indignant. 'Could he not have put us like and like together?' they asked. 'That is what he should have done, and not mix us up—police officers and farmers, gentlemen and ladies!'

"'Well,' cried the landlord at last, 'if you are agreed, I will lodge you like with like.' All readily consented, and soon all the farmers were lodged in one chamber, all the officers in another, and all the gentlemen in a third, and all the ladies in the fourth."

While you are saying this, you lay the four heaps upon one another and let the company cut them as often as they choose. But notwithstanding all their cutting, if you now tell them off in order from the bottom of the pack, and place them about the tavern, all the knaves will be in one heap, all the aces in another, and so on.

THE FOUR KNAVES

Take the four knaves, and upon the lower half of the first knave place the upper half of the second, rectangularly; upon the lower half of the second knave, place the upper half of the third, also rectangularly; then the upper half of the fourth knave upon the under half of the third; and lastly, thrust the under half of the fourth knave under the upper half of the first, and the trick is finished.

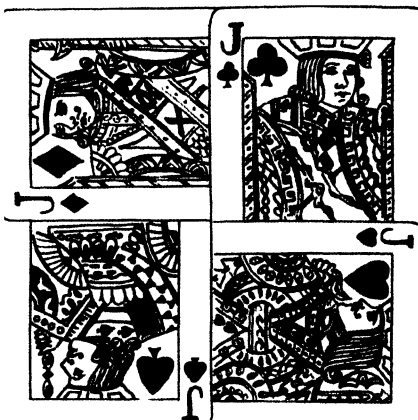


Fig. 3

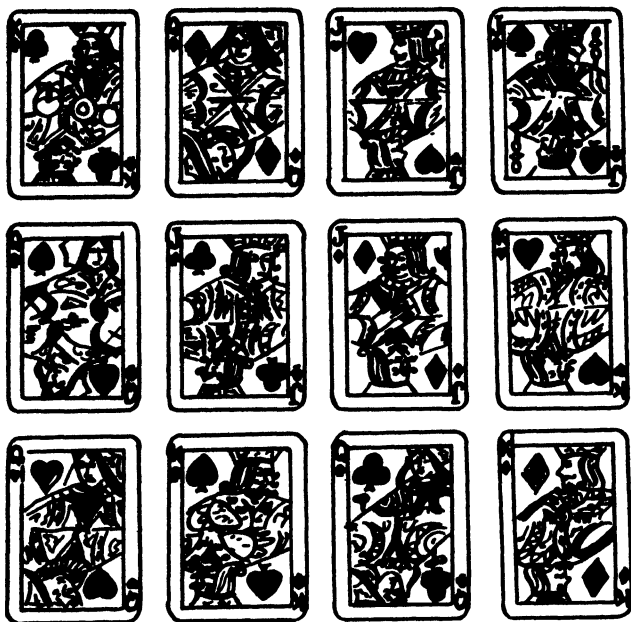


Fig. 4

THE MAGIC COURTS OF ZOROASTER

Sort the twelve court cards from the pack, excluding the aces, and place them in three rows, that is to say, with four in each row. Beginning with the fourth card in the bottom row on the right, take them up longways, that is, from the bottom to the top, one over the other, the knave of diamonds over the king of hearts, and so on, and offer them to someone to cut. It is a matter of indifference how often they are thus divided; only you must be particular to have them cut without shuffling. Now, deal them out in four divisions, and, strange as it may seem, the king, queen, and knave of each suit will be found together. The key to this inscrutable mystery consists in simply observing the following arrangement in disposing the cards at first: place one of each suit in the upper row, beginning the next row with the same suit that you closed with in the first; and commence the third or last row with a court card of the same suit that terminated the second. By thus arranging the cards you will not have two of any one suit in any of the rows, either vertically or horizontally. Figure 4 shows exactly how the cards should be placed in order to perform the trick successfully.

If you follow the above directions in taking up the cards the result will be

as described. Although this illusion is one easily performed, we never yet saw it practised without exciting the wonder of the spectators and the principle on which this is achieved, owing to the apparent consequence of the suits, has successfully baffled the calculations even of the finest investigators of this art.

THE CHOSEN ONE OR FORTY-EIGHT DISCOVERED

Take forty-eight cards, and, beginning at the *left top* corner, deal them out in six rows of eight cards; then, as they lie upon the table, there will be eight lines of six each the one way, and six of eight each the other way. The first we will call *lines* and the other *rows*; and this distinction being clearly understood, we may now begin to show the trick. Ask one of the company to choose a card. This done, ask which line it is in. When answered, be particular to remember the top card of the line, for this one card is the key to the whole trick—so don't forget it. The cards are now to be taken up exactly in the reverse order to that in which they were laid down. That is, you begin at the *right* bottom corner, picking the cards up to the right top corner. This done, the pack must be again distributed in the same order as before and the question, "What line is the chosen card in?" repeated. Receiving the reply, you can instantly fix on the chosen card. The explanation is this: Remember the top card of the *line* the card is stated to be in. Then, when the pack is again laid out it will be observed that all the cards that previously were in a *line*, *one under the other*, are now all in a *row*, *side by side* each other. Now, seeing the position of the key card, that is, the one you had especially to remember, you will know that all the cards belonging to the *line* of which it was the topmost now follow it in a *row*. Consequently, the six cards that were in one line, are now distributed or divided into six lines, one of its cards falling into each of the following lines. When the reply is given to the second interrogation, the card thought of can be instantly picked out, because the line now given only contains one that was in the original line. Consequently, the card which is now in it, and which also formed part of the original line, must be the one chosen. After a little practice, half a dozen people may each choose a card at the same time, and you will be perfectly able to reveal all.

Observe: That (after the cards have been arranged the second time) when the *line* containing the chosen card is on the *right* of the key card, the chosen card will be in the *row* *above* the key card. But when the chosen card is to the *left* of the key card it will be found in the same row.

MATHEMATICAL AMUSEMENTS

The Philosopher's Puzzle

To find a number of which the half, fourth, and seventh, added to three, shall be equal to itself. This was a favourite problem among the ancient Grecian arithmeticians, who stated the question in the following manner: "Tell us, illustrious Pythagoras, how many pupils frequent thy school?" "One-half," replied the philosopher, "study mathematics, one-fourth natural philosophy, one-seventh observe silence, and there are three females besides."

The answer is 28: 14 plus 7 plus 4, plus 3 equals 28.

The Expunged Figure

Ask someone to write down secretly, in a line, any number of figures he may choose, and add them together as units; having done this, tell him to subtract that sum from the line of figures originally set down; then desire him to strike out any figure he pleases, and add the remaining figures in the line together as units (as in the first instance), then inform you of the result, whereupon you will tell him the figure he struck out.

Suppose, for example, the figures put down are 76542; these added together as units make a total of 24. Deduct 24 from the first line and 76518 remains; if 5, the centre figure, is struck out, the total will be 22. If 8, the first figure, be struck out, the total will be 19.

In order to ascertain which figure has been struck out, you make a mental sum one multiple of 9 higher than the total given. If 22 be given as the total, 3 times 9 are 27, and 22 from 27 shows that 5 was struck out. If 19 be given, the sum deducted from 27 shows 8.

Should the total be equal multiples of 9, as 18, 27, 36, then 9 has been expunged.

With very little practice any person may perform this with rapidity; it is therefore needless to give any further examples. The only way in which a person can fail to solve this riddle is, when either the number 9 or 0 is struck out, as it then becomes impossible to tell which of the two it is, the sum of the figures in the line being an even number of nines in both cases.

The Certain Game

Two persons agree to take alternately numbers less than a given number, for example, 11, and to add them together till one of them has reached a certain sum such as 100. By what means can one of them infallibly attain to that number before the other?

The whole artifice in this consists in immediately making choice of the numbers 1, 12, 23, 34, and so on, or of a series which continually increases by 11, up to 100. Let us suppose that the first person, who knows the game, makes choice of 1. It is evident that his adversary, as he must count less than 11, can at most reach 11 by adding 10 to it. The first will then take 1, which will make 12; and whatever number the second may add the first will certainly win, provided he continually add the number which forms the complement of that of his adversary to 11; that is to say, if the latter take 8, he must take 3, if 9, he must take 2, and so on. By following this method he will infallibly attain to 89, and it will then be impossible for the second to prevent him from getting first to 100. For whatever number the second takes, he can attain only to 99; after which the first may say—"and 1 makes 100." If the second takes 1 after 89 it would make 90, and his adversary would finish by saying—"and 10 makes 100." Between two persons who are equally acquainted with the game, he who begins must necessarily win.

The Dice Guessed Unseen

A pair of dice being thrown, to find the number of points on each die without seeing them: Tell the person who cast the dice to double the number of points upon one of them and add 5 to it; then to multiply the sum produced by it by 5, and to add to the product the number of points upon the other die. This being done, ask him to tell you the amount, and having thrown out 25, the remainder will be a number consisting of two figures, the first of which, to the left, is the number of points on the first die, and the second figure, to the right, the number on the other. Thus: Suppose the number of points on the first die which came up to be 2 and that of the other 3; then if to 4, the double of the points of the first, there be added 5, and the sum produced be multiplied by 5, the product will be 45; to which if 3, the number of points on the other die be added, 48 will be produced, from which, if 25 be subtracted, 23 will remain; the first figure of which is 2 and the second figure, 3, the numbers on the first and second dice.

To Find a Number Thought of

- | | |
|--|-----|
| 1. Let a person think of a number, say | 6 |
| 2. Let him double it | 12 |
| 3. Add 4 | 16 |
| 4. Multiply by 5 | 80 |
| 5. Add 12 | 92 |
| 6. Multiply by 10 | 920 |

Let him tell you the number produced. You must then in every case subtract 320; the remainder is in this example 600; strike off the two ciphers and announce 6 as the number thought of.

Another Way to Find a Number Thought of

- | | |
|--|----|
| 1. Let a person think of a number, say | 6 |
| 2. Multiply it by itself | 36 |
| 3. Take 1 from the number thought of | 5 |
| 4. Multiply it by itself | 25 |
| 5. Tell you the difference between this product and the former | 11 |
| 6. You must then add 1 to it | 12 |
| 7. Then halve this number | 6 |

This must be the number thought of.

To Discover Two or More Numbers Which a Person Has Thought of

This holds good only when each of the numbers is less than 10. Suppose the numbers are 2, 3, and 5.

- | | |
|------------------------------------|-----|
| 1. Double the first number, making | 4 |
| 2. Add 1 to it, making | 5 |
| 3. Multiply by 5, making | 25 |
| 4. Add the second number, making | 28 |
| 5. Double this sum, making | 56 |
| 6. Add 1 to it, | 57 |
| 7. Multiply by 5 | 285 |
| 8. Add the third number | 290 |

Proceed in the same manner for as many numbers as were thought of. Then ask for the last sum produced, in this case 290. If there were two numbers thought of, you must subtract 5, if three, 55, if four, 555. In the above case you subtract 55, leaving a remainder of 235, which are the numbers thought of—2, 3, and 5.

When one or more of the numbers are 10, or more than 10, and where there is an odd number of numbers thought of: Suppose the numbers selected are 4, 6, 9, 15, and 16.

Let your audience add together the numbers as follows and tell you the various sums:

1. The sum of the 1st and the 2nd	10
2. 2nd and 3rd	15
3. 3rd and 4th	24
4. 4th and 5th	31
5. 1st and last	20

You must then add together the first, third, and fifth sums—54.

The second and fourth—46. Take one from the other, leaving 8.

Half of this is the first number—4. Take this from the sum of the first and second, and you have 6, the second number. This taken from the sum of the second and third will leave 9, the third number. And so on for the other numbers.

Where one or more than one of the numbers are 10, or more than 10, and where an even number of numbers has been thought of: Suppose the numbers thought of are 2, 6, 7, 15, 16, 18.

Let the person add together the numbers as follows and tell you the sum in each case:

1. The sum of the 1st and 2nd	8
2. 2nd and 3rd	13
3. 3rd and 4th	22
4. 4th and 5th	31
5. 5th and 6th	34
6. 2nd and last	24

You must then add together the 2nd, 4th, and 6th sums which will equal 68. And the 3rd and 5th, which will come to 56. Subtract one from the other,

leaving 12. The second number will be half of this—6. Take the second from the sum of the first and second and you will get the first—2. Take the 2nd from the sum of the 2nd and 3rd, and you will have the third number, 7, and so on.

A FEW MAGIC TRICKS



The Balanced Coin

This illustration represents what seems to be an astounding statement, namely, that a quarter or other piece of money can be made to spin on the point of a needle. To perform this experiment, procure a bottle, cork it, and in the cork place a needle. Now, take another cork, and cut a slit in it, so that the edge of the coin will fit into the slit. Next place two forks in the cork as seen in Figure 5. If you place the edge of the coin on the needle, it will spin round without falling off. The reason is this: The weight of the forks, projecting as they do, so much below the coin, brings the centre of gravity of the arrangement much below the point of suspension, or the point of the needle, and therefore the coin remains perfectly safe and upright.

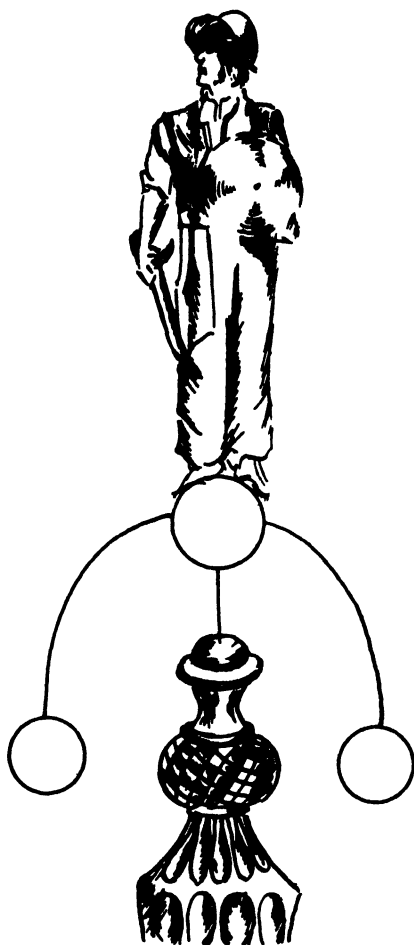


Fig. 6

The Balanced Turk

This is based on the same principle as illustrated by the coin but it calls for a little handiwork on your part. A decanter or bottle is corked and in the cork a needle is stuck. On this is balanced a small wooden ball having a cork or wooden cut-out figure standing on top. From the ball project two wires, bent to make a semi-circle and having at the ends two balls of equal weight. Push the balls and the whole will turn around on the needle, the figure standing upright all the while; twist it about from side to side as much as you like and it will always regain the upright position.

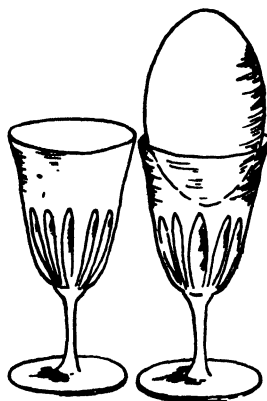


Fig. 7

The Erratic Egg

You can't use your breakfast egg for this. It must be uncooked or it won't work. Set up your simple properties as in the illustration. The problem is to transfer the egg from one wineglass to the other and back again without touching the egg or the glasses, or allowing anyone else to do so. To accomplish this, all you need do is to blow smartly on one side of the egg, and it will hop into the next glass; repeat this and it will hop back again.

To Light a Candle Without Touching the Wick

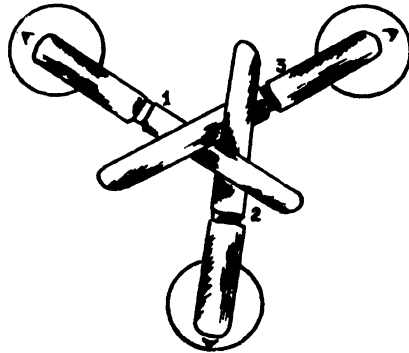
Let a candle burn until it has a good long snuff; then blow it out with a sudden puff; a bright wreath of smoke will curl up from the hot wick. Now, if a flame be applied to this smoke, even at a distance of two or three inches from the candle, the flame will run down the smoke and rekindle the wick in a very fantastic manner. To perform this experiment nicely, there must be no draught while the mystic spell is rising.

The Spanish Dancer

Here is an experiment in rotary motion. Take a piece of cardboard and cut out a little figure such as that in Figure 8. Paste or gum it in an upright position to the inside of a watch-glass. Take a plate or a small tin tray, place the watch-glass holding the figure on it, incline the plate and it will, of course, slide down. Next, put a drop of water on the plate, place the watch-glass on it, and again incline it. Instead of sliding it will begin to revolve. It will continue to revolve with increasing velocity, obeying the position and inclination of the plate, as directed by the hand of the experimentalist. The reason for

*Fig. 8*

this is that, in consequence of the cohesion of the water to the two surfaces, a new force is introduced by which an unequal degree of resistance is imparted to different parts of the wine-glass in contact with the water, and consequently, in its effort to slide down, it revolves. The drop undergoes a change of figure; a film of water, by capillary motion, is drawn to the foremost portion of the glass, while, by the centrifugal force a body of water is thrown under the hinder part of it. The effect of these actions is to accelerate the motion.

*Fig. 9*

The Bridge of Knives

Place three knives—A, A, A,—in the form of a triangle, and arrange three knives upon them as illustrated. The blade of No. 1 over No. 2, and that over No. 3, which rests on No. 1. The bridge so made will be self-supported.

18. MORE puzzles and teasers

SOLVING PUZZLES AND RIDDLES is a time-honoured diversion and one of the best ways of getting away from one's self, as the saying goes. A speculative person could build up quite an essay on the mental tendencies of past eras by delving into the records and taking note of the puzzles which have engaged the minds of various peoples at certain times in their history, for fashions have come and gone in puzzles as in clothes and other ways of life.

The prevailing modes with us have been, for some time, cross-words, and mystery and detective stories, which are really only extended puzzles—who did it and how?

Our forefathers of two and three generations ago had a great taste for this sort of thing and the old household magazines and Sunday School papers always carried columns of enigmas and acrostics, or whatever happened to be the vogue of the day. Then it was rare for people to do much coming and going after dark, except on urgent errands. Families would gather in sitting-rooms or dining-rooms to amuse themselves until bedtime with quiet games and handiwork. "Round the Evening Lamp" was the name of one popular column in a publication which held first place as a family magazine during fifty years or more of the nineteenth century. The illustrations show family groups working and playing by lamplight; sometimes there is a large central lamp suspended from the ceiling by chains for pulling it up and down; other pictures show table lamps with open shades spreading their light over a wide area—the famous old "Rochester burners" of our grandsires. Fine homes always had oil "student lamps," single or double, for libraries and sitting-rooms. In those lamplight times, puzzles and riddles were at their peak of popularity.

From a cherished collection of books and papers dating back seventy to ninety years and some of them even earlier, we have chosen some examples of the puzzles which pleased our fairly recent forebears. In times before printing presses were brought to their present degree of efficiency (not to

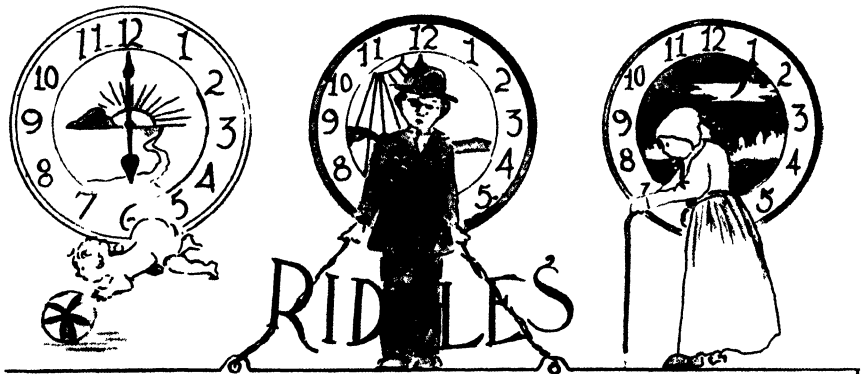
mention the problem of distribution) it was not as easy to break into print as it is today. It is impressive, therefore, to find how many puzzle books were turned out in England and America during the eighteenth and nineteenth centuries.

We have not tampered with the old-fashioned language, for that adds piquancy to this simple pastime. We will leave it to you to try your hand at up-to-date variations of the different types of teasers, after you have worked out the ones we have chosen. Perhaps you will be impressed, as we were, with the pains they took in those leisurely days to make their paper and pencil games interesting—versifying sometimes, and adding savour by using colourful narrative style and romantic settings to what would otherwise be, perhaps, only a homely mathematical problem concerning the division of a basket of eggs.

One ancient puzzle book starts off this way:

“Fabled History of the First Riddle.

“The ancients believed that the monster Sphynx was the inventor of riddles. The one she proposed for solution was this: ‘What animal is that which goes upon four legs in the morning, upon two at noon, and upon three at night?’ Many persons strove to explain it, and failed, and were torn to pieces by her. At length, Oedipus solved it by saying that the animal was a man, who, in infancy, or in the morning of his life, creeps upon his hands



FABLED HISTORY OF THE FIRST RIDDLE

What animal is it that goes on four legs in the morning, upon two at noon, and upon three at night?



and feet and so goes upon all fours, in the noon of his life walks on two feet, and in the night of old age, requires a stick, and so totters upon three legs."

Propounding riddles, with a prize or a penalty attached according to whether one could guess it or not, was a favourite way in which many Old Testament characters confounded their enemies. One of the most famous of these Bible riddles was that of Samson. You can find it in Chapter XIV of Judges. We recommend that you read the whole chapter—a very short one—for it is an excellent story. The riddle went as follows: "Out of the eater came forth meat, and out of the strong came forth sweetness." Samson was sure that he had his Philistine wedding guests completely baffled, and that the stake he had declared—thirty sheets and thirty changes of garments—would be his. But he was badgered by his Philistine bride into telling her the answer and she gave it away to her brethren. In wrath Samson exclaimed to them, "If ye had not plowed with my heifer, ye had not found out my riddle." The rest of the tale you must read for yourself.

And now we leave you to wrestle with our forty-odd puzzles of yesterday. To find the answers turn to page 301.

FORTY-ODD WIT-CATCHERS

No. 1. Arithmetic Tangle. A countrywoman carrying eggs to a garrison, where she had three guards to pass, sold to the first guard half the number she had and half an egg more; to the second, the half of what remained and half an egg besides; and to the third guard she sold the half of the remainder and half another egg. When she arrived at the market place she had three dozens still to sell. How was this possible without breaking any of the eggs?

No. 2. Enigma. I am a word of four letters, two of which are of no importance, signifying nought. For myself, I am an article of extended use, and worn by a lady, a friar, a snake, a clergyman, a flower, and a bird. I gave a surname to a famous archer who lived about the time of Richard I, and to a poet of the reign of Victoria. My family is large, though I am an orphan, for when I go among them, I can count sisters and brothers, maidens and



mothers. I am somewhat addicted to single life, for I dwell with spinsters, yet I am fond of society, for where a great many neighbours dwell together you will always find me. I am rather of a monastic turn, too, and have patronized Beguines and Soeurs de Charité, Capuchins, and Franciscans. Kings and queens favour me, however, when I assume knightly orders, and I flourish highest under their protection. Wherever I am, I am at least sure of subsistence. In all probability you have seen my like, but even when you mind me you may be puzzled, for I often show two faces.

This typical enigma of about sixty or seventy years ago was a favourite way of inculcating or recalling historic tidbits.



No. 3. An Enigmatical List of Trees. What is the sociable tree (a), and the dancing tree (b), and the tree that is nearest the sea (c)? The most yielding tree (d), and the busiest tree (e), and the tree where ships may be (f)? The languishing tree (g), the least selfish tree (h), and the tree that bears a curse (i), The chronological tree (j), and the fisherman's tree (k), and the tree like an Irish nurse (l)? What's the telltale tree (m), the fisherman's tree (n), and the tree that is warmest clad (o)? The laymen's restraint (p), and the housewife's tree (q), and the tree that makes us sad (r)?



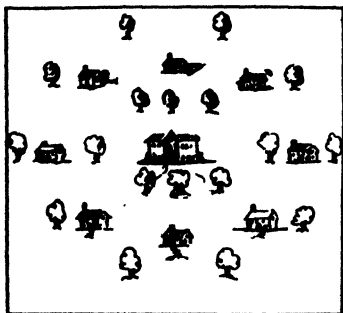


No. 4. The Two Travellers. Two poor boys, Tom and Ned, walk between London and Wolverhampton. Tom leaves the latter place at 8 o'clock in the morning, and walks at the rate of three miles an hour without intermission, and Ned sets out at 4 o'clock the same evening and walks for Wolverhampton at the rate of four miles an hour constantly. Now, supposing the distance between the two places to be 130 miles, whereabouts along the road will they meet?

No. 5. Word Puzzle. (a) Name an English word containing eight syllables. (b) Name an English word in which the letter "i" occurs five times. (c) Name at least three English words, each of which contains all the vowels, including "y."

No. 6. Enigma. There is a certain natural production which exists from two to six feet about the surface of the earth. It is neither animal, vegetable, nor mineral, neither male nor female, but something between both. It has neither length, breadth, nor substance, is recorded in the Old Testament, and mentioned in the New, and it serves the end of both treachery and fidelity.

No. 7. The number 45. How can the number 45 be divided into four parts so that if you add two to the first part, subtract two from the second part, multiply the third part by two, and divide the fourth part by two, the total of the addition, the remainder of the subtraction, the product of the multiplication, and the quotient of the division are all equal?



No. 8. The Grasping Landlord. (Fig. 1.) Suppose a certain landlord had eight apple trees around his mansion; around these, eight houses of his tenants; around these, ten pear trees. He wants to have all of the pear trees to himself and allot to each of his tenants one of his apple trees in their place. How must he construct a fence or hedge to accomplish it?

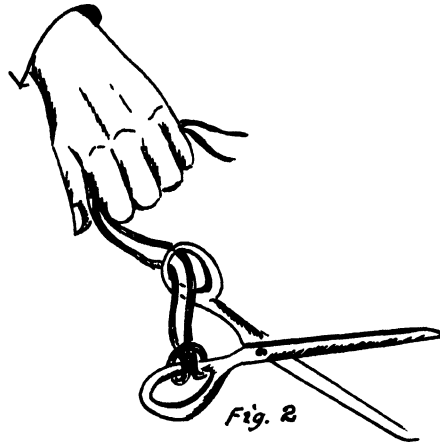


Fig. 2

No. 9. (Fig. 2.) Entangled Scissors. This is an old but a capital puzzle. A piece of double twine is fastened to a pair of scissors as shown in the cut, and both the ends are held with the hand while another person extricates the scissors from the twine.

No. 10. Words Within Words. (a) An animal in a candle. (b) A path in a star. (c) A stream of water in a fruit. (d) A crime in a clergyman. (e) An owl's cry in tree branches. (f) A sign in a cosmetic. (g) A propeller in what it was made from.

No. 11. Combination Star. (Fig. 3.) From 1 to 2 a brag-gart. From 1 to 3 makes happy. From 2 to 3 argues rationally. From 4 to 5, the principal gold coins of ancient Greece. From 4 to 6, to satisfy. From 5 to 6, the shortening of a long syllable.

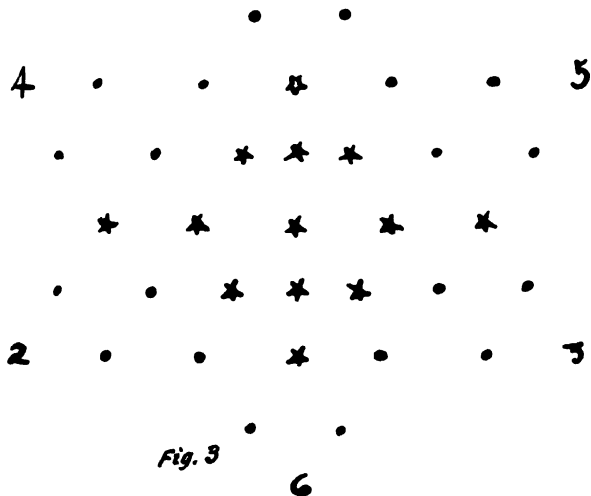


Fig. 3

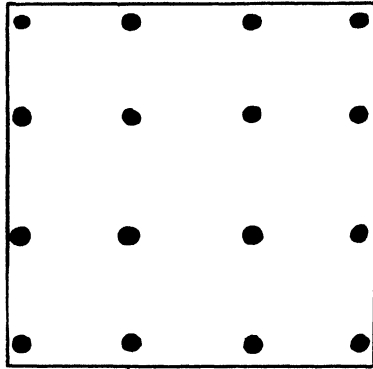


Fig. 4

No. 12. The Carpenter's Puzzle. (Fig. 4.) A ship having sprung a leak at sea, and being in great danger, the carpenter could find nothing to mend it with except a piece of wood of which the accompanying cut is a correct representation. The black dots in it represent holes in the wood, thus apparently preventing him from cutting out of it the size piece he wanted, which was exactly one-fourth of its own size, having no holes in it. Can you tell how the square piece was cut from the board?

No. 13. The Three Jealous Husbands. Three jealous husbands, A, B, and C, with their wives, being ready to pass by night over a river, find at the waterside a boat which can carry but two at a time, and for want of a waterman they are compelled to row themselves over the river several times. The question is, how these six persons shall pass, two at a time, so that none of the three wives may be found in the company of one or two men unless her husband be present.

No. 14. The Landlord Tricked. Twenty-one persons sat down to dinner at an inn, with the landlord at the head of the table. When dinner was finished it was resolved that one of the number should pay the high score, to be decided as follows: A person should commence counting the company, and every seventh man was to rise from his seat until all were counted out but one, who was to be the person who should pay the whole bill. One of the waiters was fixed upon to count the company out, and he, owing to his master a grudge, resolved to make him the person who should have to pay. How did he proceed to accomplish this?

No. 15. The Two Drovers. Two Drovers, A and B, meeting on the road, began discoursing about the number of sheep each had. Said A to B: "Pray give me one of your sheep and I will have as many as you." "Nay," replied

B, "but give me one of your sheep and I will have as many again as you." How many sheep had each?

No. 16. Quibbles. (a) If you cut thirty yards of cloth into one-yard pieces, and cut one yard every day, how long will it take? (b) A person tells another that he can put something in his right hand which the other cannot put into his left. (c) A person may, without stirring from the room, seat himself in a place where it will be impossible for another person to do so. Explain this.

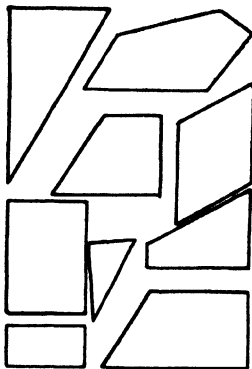


Fig. 5

No. 17. (Fig. 5.) The Square Puzzle. Cut pieces of cardboard in the shapes here indicated and arrange these pieces so that when set close together they will form a perfect square.

No. 18. Quibbles. (a) How must I draw a circle around a person placed in the centre of a room so that he will not be able to jump out of it though his legs should be free? (b) If five times four are thirty-three what will the fourth of twenty be? (c) What is the difference between twice twenty-five and twice five and twenty?

No. 19. The Divided Garden. (Fig. 6.) A person let his house to five inmates and having a garden attached to the house, he wished to divide it also among them. There were ten trees in the garden and he desired to divide it so that each of the tenants should have an equal share of garden, and two trees. How did he do it?

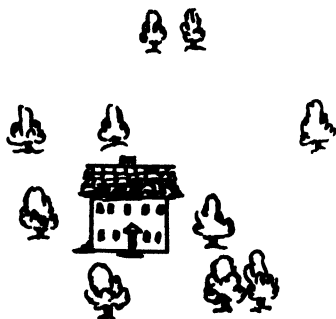


Fig. 6

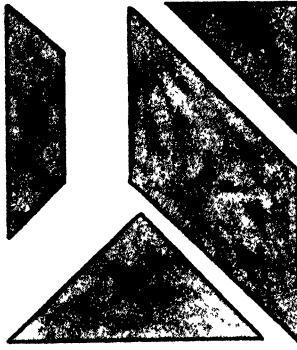


Fig. 7

No. 20. The Puzzle of Fourteen. (Fig 7.) Cut out of cardboard fourteen pieces of the same shapes and relative sizes as those shown in the design, and then form an oblong with them.

No. 21. Cross Words.

My first is in a shark but not in a whale,
 My second is in the head but not in the tail;
 My third is in even and not in odd,
 My fourth is in a river and not in the sod.
 My fifth is in isle and also in mountain,
 My sixth is in dale though not in a fountain,
 My seventh is in army and also in camp.
 While my eighth is in candle, but not in lamp.
 My whole is a soldier brave and bold,
 Whose laurels of fame will never grow old.

No. 22. The Yankee Square. (Fig 8.) Cut as many pieces of each figure in cardboard as they have numbers marked on them, then form these pieces into a square.

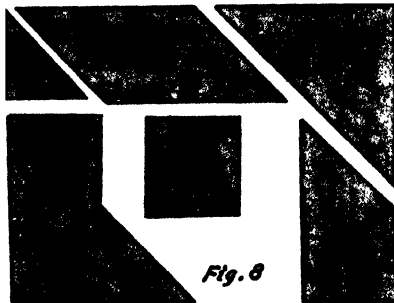


Fig. 8

No. 23. Original Arithmetic. Example: What number becomes even by subtracting one? S-even. (a) What number, by adding one, becomes sound? (b) What number, by adding one, becomes isolated? (c) What number, by inserting one, becomes finely ground meal? (d) What number, by subtracting one, becomes a vegetable growth? (e) What number, by subtracting one, becomes a preposition? (f) What number, by subtracting one, becomes an exclamation?

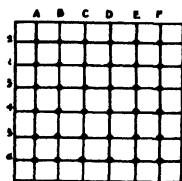


Fig. 9

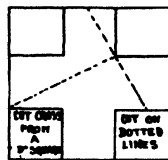


Fig. 10

No. 24. One Line, One Counter Puzzle. (Fig 9.) Place six counters on the dotted angles of any of the squares in the diagram so that no two counters shall be in the same line, either straight or diagonal. Unless the counters are very small, it will be advisable to rule a larger diagram before placing them.

No. 25. The Maltese Cross Squared. (Fig 10.) Divide a Maltese cross, by straight cuts, into four pieces, so that the pieces when put together will form a square.

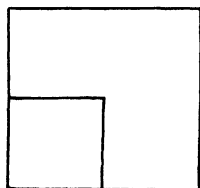


Fig. 11

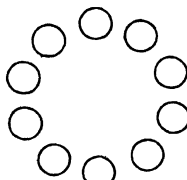


Fig. 12

No. 26. Geometrical Puzzle. (Fig 11.) A man has a square of land out of which he reserves one-fourth, as shown in the cut, for himself. The remainder he wishes to divide among his four sons, so that each will have an equal share, and in similar shape, as his brother. How can he divide it?

No. 27. Crossette. (Fig. 12.) Start from any circle, and, counting that Circle 1, the next 2, the next in the same direction 3, and the next 4, cross out the circle counted 4. Start again from any circle not crossed out. Count as before in the same or the reverse direction, and cross out the circle counted 4. Crossed circles, though not to be started from, are to be included in the count of 4, and are not to be passed over because crossed out. Continuing to count 4 from any circle, not crossed out, and to cross out the fourth, all the circles but one are to be crossed out.

No. 28. The Crown Problem. First place ten checker men in a row thus—1, 2, 3, etc. Now the problem is to lift a man up and, passing over two men at a time, neither more nor less, to crown the next man, continuing to do this until all are kings. In passing over a man already crowned it is to be reckoned as two men.

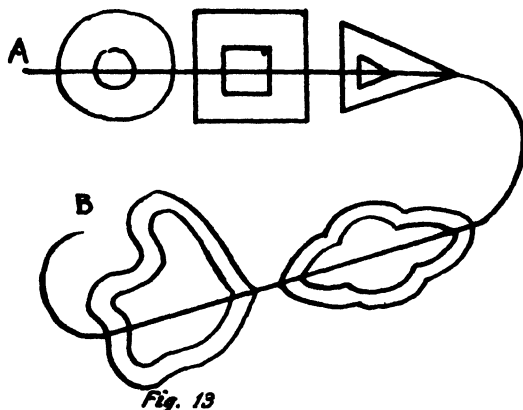


Fig. 13

No. 29. A Trick for Clever Pencils. (Fig. 13.) Starting at A, make this figure with one continuous line, without taking the pencil from the paper or going over any line twice, finishing at B.

No. 30. The Puzzling Puzzle. (Fig. 14.) A lady sent a cross of pearls to be repaired by a jeweller. To provide against the pearls being stolen, she observed that, counting from the bottom of the cross upward, in any direction, the number of pearls was nine, as illustrated each figure representing a pearl.

But the jeweler cleverly abstracted two of the pearls and rearranged the remainder so that they still retained the original form and counted nine as before. How did he do it?

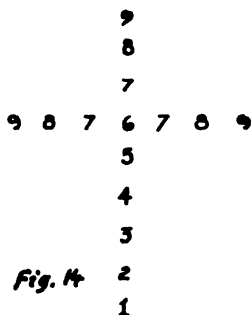


Fig. 14

No. 31. The Magic Octagon. (Fig. 15.)

Upon a piece of cardboard draw,
The three designs below;
I should have said of each shape four,
Which, when cut out, will show,
If joined correctly, that which you,
Are striving to unfold—
An octagon, familiar to
My friends, both young and old.

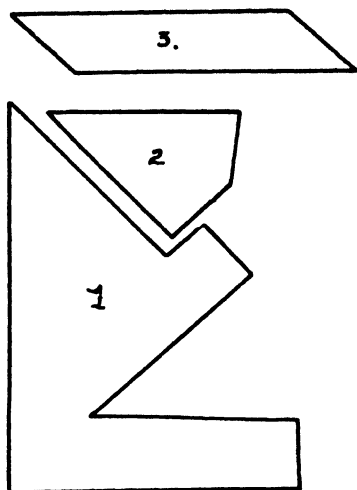


Fig. 15

CUT FOUR OF EACH

No. 32. A Presidential Puzzle. One-eighth of the name of the bachelor president; one-fifth of the name of the hero of the Civil War; one-eighth of the president who was assassinated in the Baltimore depot at Washington; one-sixth of a vice-president who became a president; one-seventh of a president who had been a rail splitter; one-fifth of a president whose election was disputed; one-seventh of a president who was impeached; one-ninth of a president during whose term two great commanders of the late war died; the fractions combined give the name of another president.

No. 33. The Puzzle Board. (Fig. 16.) These disjointed syllables can be converted into a familiar stanza of poetry. The player may move in any

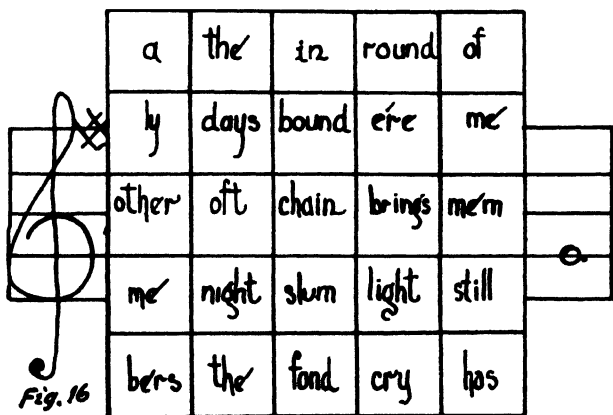


Fig. 16

direction over the board and pass over as many squares at a time as he likes.

No. 34. A Word Puzzle. I was a president of the U. S. In my name find a river of Asia, the names of five girls, the nicknames of five boys, the name of one boy, the name of one kind of drink, "to fasten," "a low place between hills," "the home of wild beasts," "to give up," "a narrow passage," "to loan," "to raise and make light," "a young boy," "to go before," "a kind of fish," "to bathe," "a measure of different lengths," "not much in use now," "to be clad," "a kind of meat," "to go on shore," "a tribe," "to dig," "their," "to part," "a conjunction," "a reed," "to purify," "a weathercock," "a native of Denmark," "to adhere," "a valley," "to distribute," "a word sometimes used for one," an imaginary being, "a brief visit," "an instrument by which to find a horizontal line," "a vine," "to finish," and other words.

No. 35. The Legacy. An Arab sheik about to die called his sons to him and bequeathed to them his herd of camels in the following fashion: To his eldest son, $\frac{1}{2}$ the herd, to his second son, $\frac{1}{4}$, and to his youngest, $\frac{1}{5}$. As soon as the last honors had been paid to the old chief, the sons hurried to divide the legacy; but as there were 19 camels in the herd (a number not divisible by 2, 4, and 5) they were unable to agree. Finally they referred the matter to the *cadi* or judge, who immediately made his division to the satisfaction of the three, each of whom went away driving with him his camels. How did the *cadi* do this?

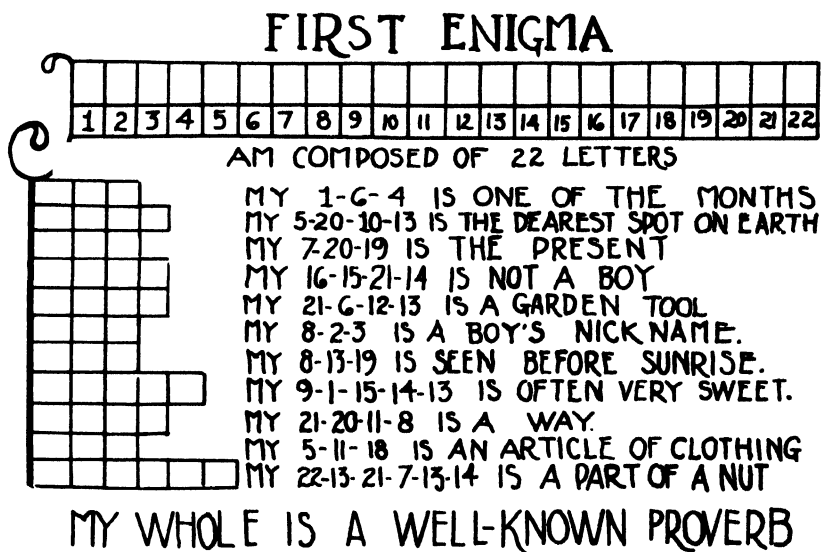
No. 36. A Charade.

I went to the barn this morning,
And what do you think I found?
A poor little first with a broken leg,
A cross old hen and a broken egg,
And Neighbor Nesbit's hound.
I went to the garden this morning,
And what do you think I found?
A bold little second—yes, one, two, three,
Just where I wanted them not to be,
With their heads well up from the ground.
I looked about in the garden,
And what do you think I found?
Some whole—and 'twas spreading here and there,
For it wouldn't grow straight up into the air,
But crept along the ground.

No. 37. The Philosopher's Puzzle. A philosopher had a window a yard square. It let in too much light. He blocked up half of it, leaving a square hole a yard long and a yard wide. How did he do it?

No. 38. The Bishop of Oxford's Puzzle. All of the following are in the human body: Two musical instruments. Two established measures. A great number of things a carpenter cannot dispense with. Have always a number of good fish and a number of small ones. Two lofty trees. Two fine flowers. Two playful animals. With a number of smaller, less tame breeds. A fine stag. A great number of whips without handles. Some weapons of warfare. A number of weathercocks. The steps of a hotel. A wooden box. The House of Commons on the eve of division. Two students. A number of grandees to wait upon them. Two beautiful phenomena. An article used by Titian. A boat in which balls are held. An article used for crossing rivers. A pair of blades without handles. A letter finished with bows. Secure fastenings for the whole.

No. 39. First Enigma. (Fig. 17.)



SECOND ENIGMA

I AM COMPOSED OF 30 LETTERS

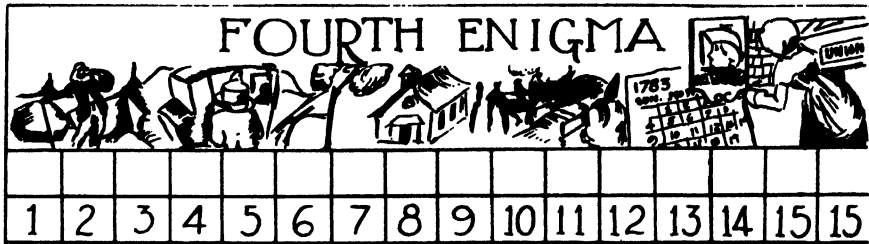
MY 11-20-25-7-4-8-3 IS EASILY BROKEN
MY 11-16-18-22-28 IS HARDER THAN IRON
MY 7-26-18-27-12-4-10 IS EXCEEDINGLY LARGE
MY 5-9-1-4-15 IS A YELLOWISH-BROWN COLOR
MY 13-2-24-19 IS ANOTHER WORD FOR FANCY
MY 23-17-3-30 IS LEFT AFTER MAKING CHEESE
MY 21-14-11-11-20-29 IS LIKE CINNAMON

No. 40. Second Enigma. (Fig. 18.)

I AM COMPOSED OF 26 LETTERS

MY 24-2-15-78-13 IS A FRUIT
MY 12-11-25-18 IS A PART OF OUR BODY
MY 22-19-14-15-21 IS A MUSICAL INSTRUMENT
MY 26-1-4-23-11-7 IS A KIND OF FISH
MY 18-4-5 IS A YARD AND A QUARTER
MY 2-11-20-13 IS A COMMON FLOWER
MY 23-3-10-17 IS AN INSECT
MY 16-6-23 IS A BOY'S NICKNAME
MY 9-16-15-8-18 IS A VEHICLE

No. 41. Third Enigma. (Fig. 19.)



AM COMPOSED OF 16 LETTERS

] MY 13-5-16-9-12 SIGNIFIES FORCE AND ENERGY

MY 1-4-7 IS A HEAD COVERING

MY 11-15-10 IS A PLACE OF ENTERTAINMENT

MY 4-2-12-8 IS A FLEET-FOOTED ANIMAL

MY 5-11-6 IS WHAT WE ALL ARE PRONE TO DO

MY WHOLE ISAN AMERICAN AUTHOR

No. 42. Fourth Enigma. (Fig. 20.)

No. 43. Five Arab Maxims. Explain the five Arab maxims following:

Never	All	For he who	Everything	Often	More than
Tell	You may know	Tells	He knows	Tells	He knows
Attempt	You can do	Attempts	He can do	Attempts	He can do
Believe	You may hear	Believes	He hears	Believes	He hears
Lay out	You can afford	Lays out	He can afford	Lays out	He can afford
Decide upon	You may see	Decides upon	He sees	Decides upon	He sees

PROTEAN PUZZLE

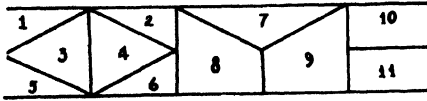
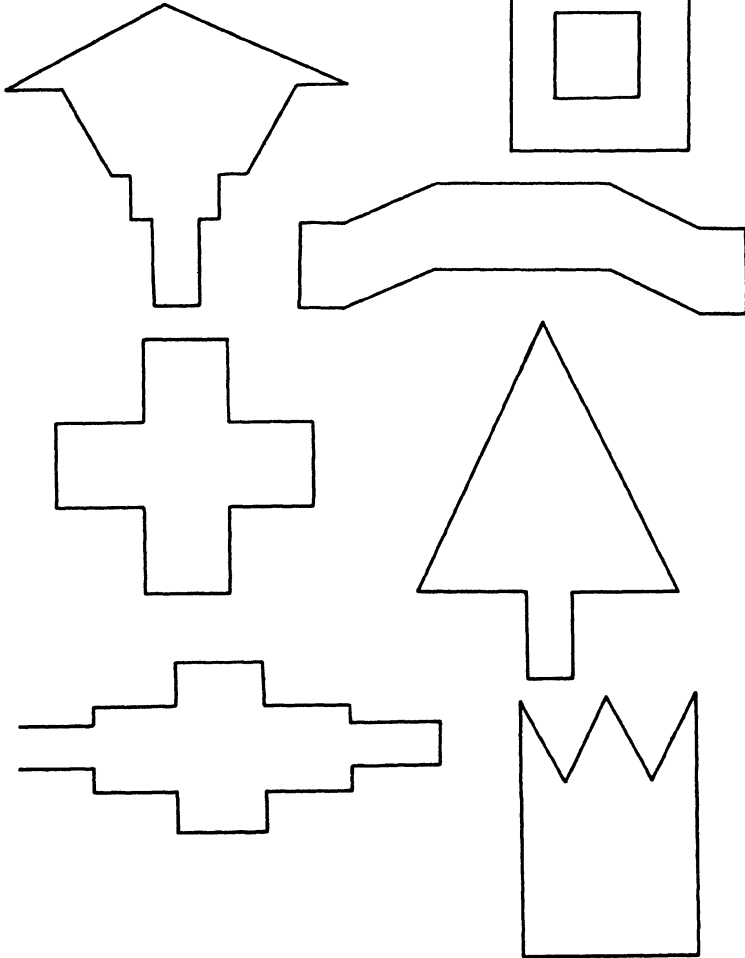


Fig. 21



No. 44. The Protean Puzzle. (Fig. 21.) Cut a piece of stiff cardboard or basswood in the shape of Figure 21. Let it be about five inches long by one inch broad. Cut it then into eleven pieces, as indicated, and with these eleven pieces form a cross. After this, by changing the position of the pieces, form them into the several shapes outlined above.

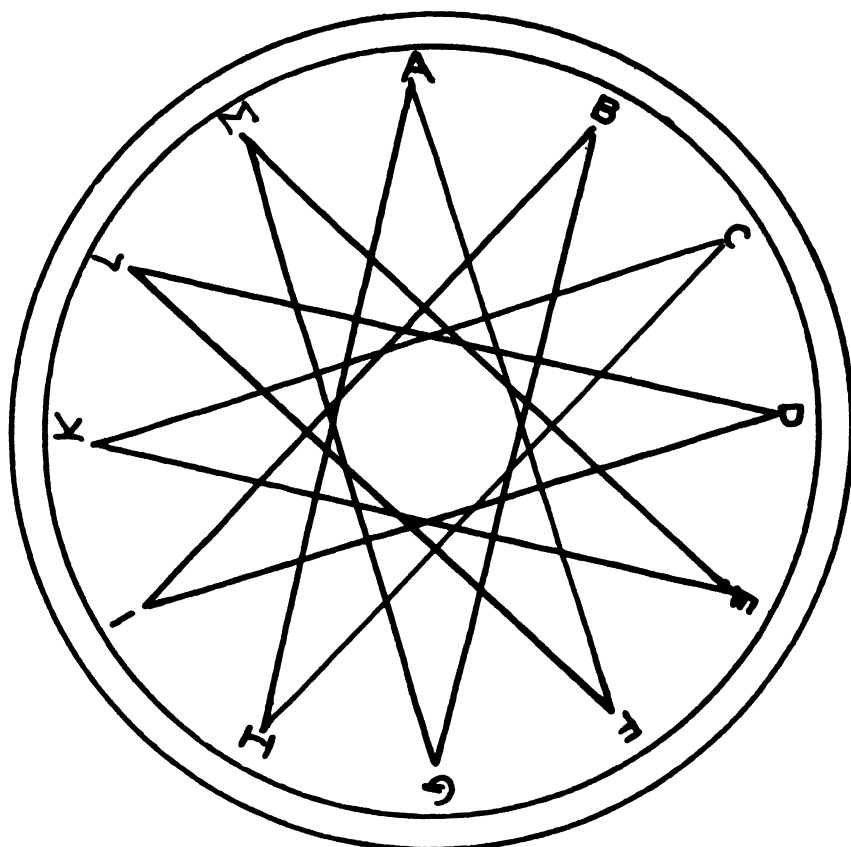


Fig. 22

No. 45. The Twelve-Cornered Star. The circle represented in the cut, is divided at the twelve points, A to M, by lines so drawn that they form a star with twelve points. (Fig. 22.) From the point A draw a line to F, from F to L, to D, to I, to B, to G, to M, to E, to K, to C, to H, and back again to A.

The problem now to be solved is how to distribute the twelve numbers of the following arithmetical progression 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, into the twelve compartments of the twelve letters which stand at the twelve points of the star in such a manner that the sum of any two numbers that lie side by side, when added together, shall be equal to the sum of the two numbers which are at the two opposite points of the star.

No. 46. The Circle Puzzle.

Twenty lines upon paper place,
 On every line five circles trace;
 These circles should just in amount,
 Or number, thirty-seven count;
 And every circle, orb, or round
 Upon an angle should be found—
 At an equal distance, too, should be
 Upon each line—solve this for me.

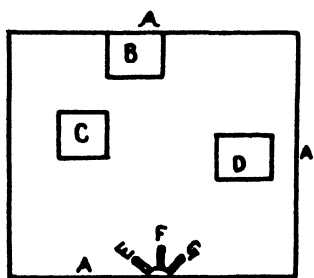


Fig. 24

No. 47. The Fountain Puzzle. (Fig. 24.) A is a wall. B, C, D, three houses, and E, F, G, three fountains or canals. It is required to bring the water from E, to D, from G, to B, and from F, to C, without one crossing the other or passing outside of the wall, A.

No. 48. The Cabinet Maker's Puzzle. (Fig. 25.) A cabinet maker has a circular piece of veneering, with which he has to veneer the top of two oval stools, but it so happens that the area of the stools, exclusive of the hand holes in the centre, and that of the circular piece are the same. How must he cut his veneering so as to be exactly sufficient for his purpose?

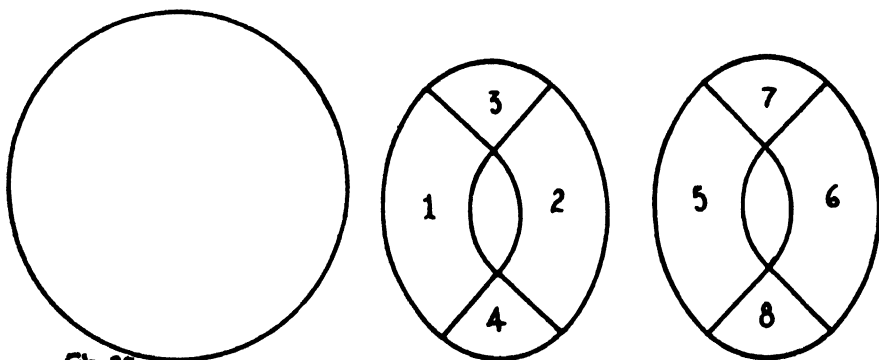
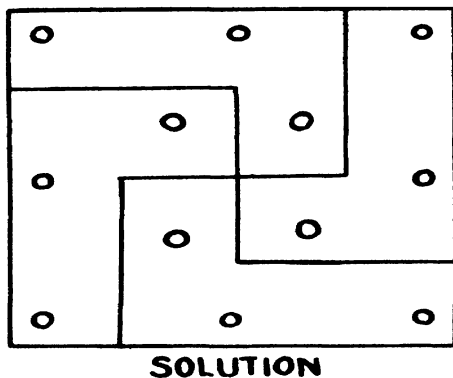
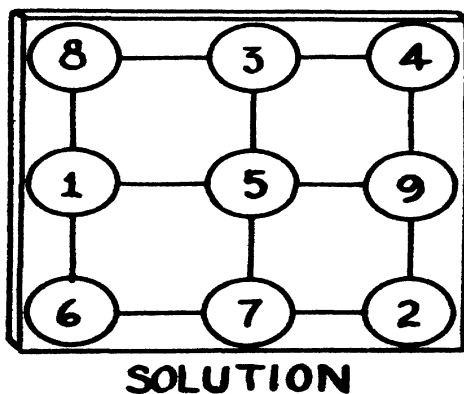


Fig. 25

19. ANSWERS



Page 259. (Fig. 12)—Solution.



Page 259. (Fig. 13)—Solution.

Figure 14, Solution: Draw loop D well down, slipping through E bead. Push D through hole A at end of stick. Pass it over knot at back and draw through A again. Repeat same with the other bead. Loop can be drawn through hole B centre, and bead will slide along cord until it reaches the other side. Cord is then replaced, with both beads on same side.

Figure 15, Solution: Bend up leather slit together at A, bring forward down through hole B, to form loop. Beads pass through.

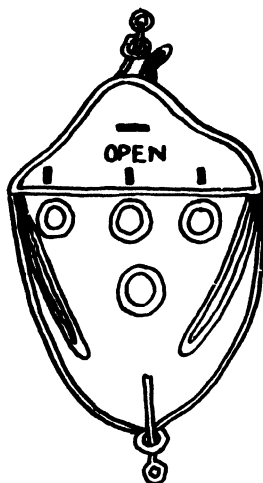


Figure 16, Solution: Push bead A close to board under E and pull loop C through as much as will come. Pass end of loop up through hole B, over bead D from right to left. Pull loop C back through B, and loop will separate and bead will come off.

Figure 17, Solution: Untie two ends and bring up loop at H2, far enough to allow bead to slide through. Bring bead along cord under frame to the left, slide it through ring and bring ring to top of frame. Continue loosening loops at top of holes and exchanging rings with beads until puzzle is reversed.

Figure 18, Solution: Place heart before you as in diagram. (Page 262.) Slacken cord by drawing bead from back towards hole six, and retrace steps used in setting up puzzle.

Figure 19, Solution: Separate slip knot, then pass bead through loop of the loosened knot and it will free itself. Other end is drawn through straw.

Figure 20, Solution: Remove stick by reversing process.

Answers to More Puzzles and Teasers

Chapter ~~XVII~~ Page 280

No. 1. Arithmetical Tangle. In taking the greater half of an odd number, we take the exact half plus one-half. When the woman passed the first guard she had 295 eggs. By selling to him 148, which is one-half plus one-half, she had 147 eggs remaining. To the second guard she sold 74, which is the major half of 147. And of course, after selling 37 out of 73 to the last guard, she had still three dozens remaining.

No. 2. Enigma. Hood.

No. 3. Enigmatical List of Trees. (a) Pear tree. (b) Caper tree. (c) Beech. (d) Cedar (ceder). (e) Medler (meddler.) (f) Bay. (g) Pine. (h) Service tree. (i) Juniper. (j) Date. (k) Box. (l) Honeysuckle. (m) Peach. (n) Codling. (o) Fir. (p) Birch. (q) Broom. (r) Bleeding heart cherry.

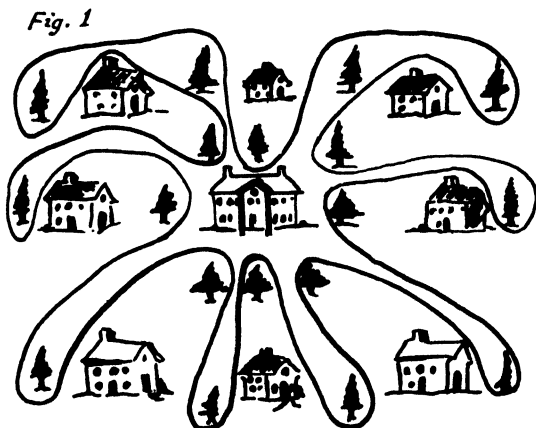
No. 4. The Two Travellers. $69\frac{3}{7}$ miles from Wolverhampton.

No. 5. Word Puzzle. (a) Incomprehensibility. (b) Visibility. (c) Revolutionary. (d) Elocutionary. (e) Unquestionably.

No. 6. Enigma. A kiss.

No. 7. The Number 45. The first is 8, to which 2 being added, makes 10; the second is 12, from which 2 being subtracted, leaves 10; the third is 5, which being multiplied by 2 makes 10; the fourth is 20, which being divided by 2, the quotient is 10.

No. 8.—The Grasping Landlord. (Fig. 1.)



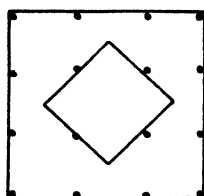
No. 9. Entangled Scissors. The scissors may be released by drawing the noose upward through the eye of the scissors and passing it completely over them.

No. 10. Words Within Words. (a) T-ape-r. (b) P-lane-t. (c) P-run-e. (d) P-arson-s. (e) S-hoot-s. (f) L-amen-t. (g) B-oar-d.

No. 11. Combination Star. From 1 to 2, Boaster; from 1 to 3, Blesses; 2 to 3, Reasons; 4 to 5, Staters; 4 to 6, Sate; 5 to 6, Systole; enclosed diamond, 1, T; 2, Head; 3, Tares; 4, Don; 5, S.

No. 12. The Carpenter's Puzzle. (Fig. 4.)

Fig. 4



No. 13. The Three Jealous Husbands. This may be effected in two or three different ways. The following may be as good as any: Let A and wife go over—let A return—Let B's and C's wives go over—A's wife returns—B and C go over—B and wife return—then C comes back for his wife. Simple as this question may appear, it is found in the works of Alcuin, who flourished a thousand years ago, hundreds of years before the art of printing was invented.

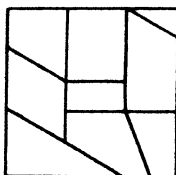
No. 14. The Landlord Tricked. Begin to count with the sixth from the landlord.

No. 15. A had seven sheep, and B had five.

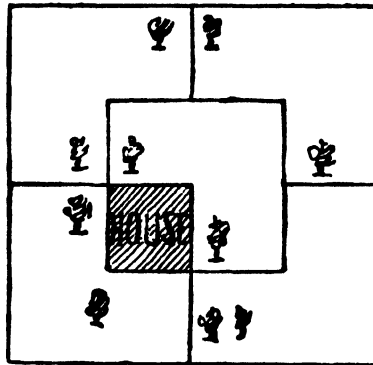
No. 16. Quibbles. (a) 29 days. (b) The last person's left elbow. (c) The first person seats himself in the other's lap.

No. 17. The Square Puzzle. (Fig. 5.)

Fig. 5



No. 18. Quibbles. (a) Draw it round his body. (b) $8\frac{1}{4}$. (c) Twice 25 is fifty and twice 5 and 20 is thirty.



No. 19. The Divided Garden. (Fig. 6.)

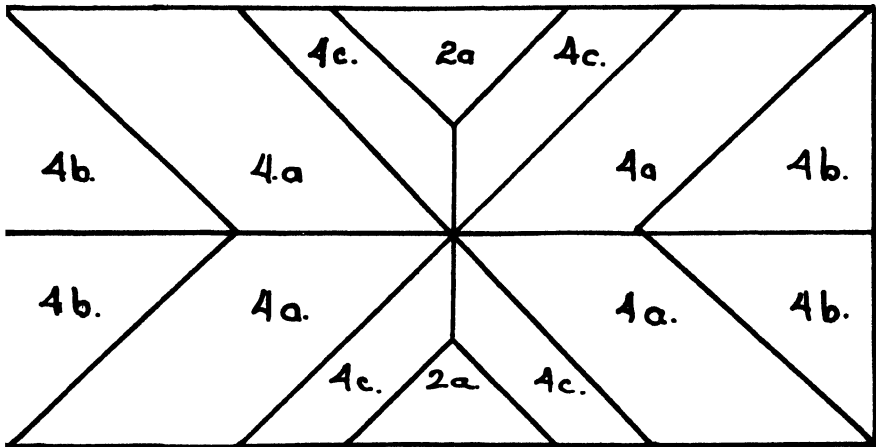


Fig. 7

No. 20. The Puzzle of Fourteen. (Fig. 7.)

No. 21. Cross Words. Sheridan.

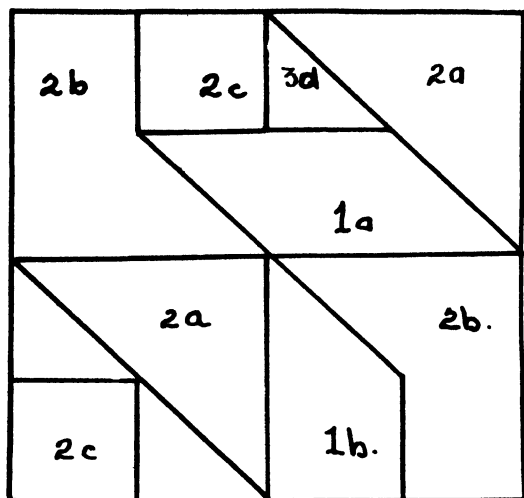


Fig. 8

No. 22. The Yankee Square. (Fig. 8.)

No. 23. Original Arithmetic. (a) T-one. (b) L-one. (c) Fll-our.
 (d) T-h-ree. (e) T-w-o. (f) Fi-v-e.

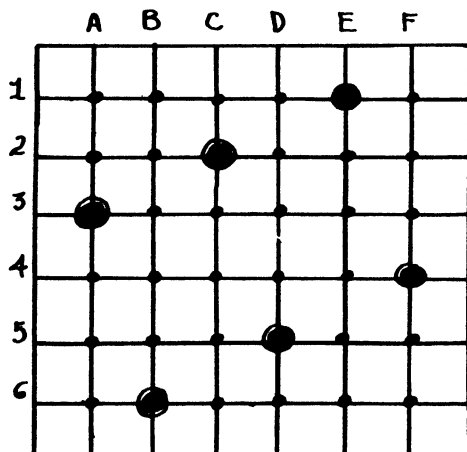


Fig. 9

No. 24. One Line, One Counter Puzzle. (Fig. 9.)

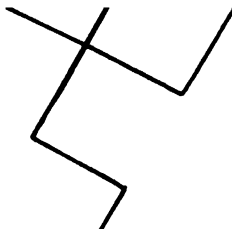


Fig. 10

No. 25. The Maltese Cross Squared. (Fig. 10.)

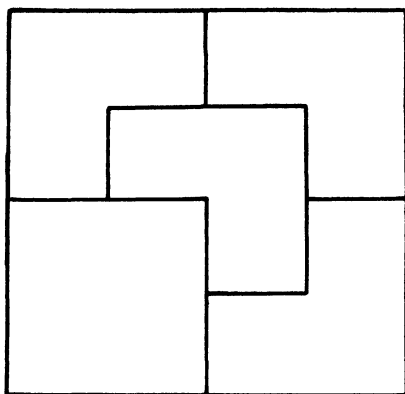
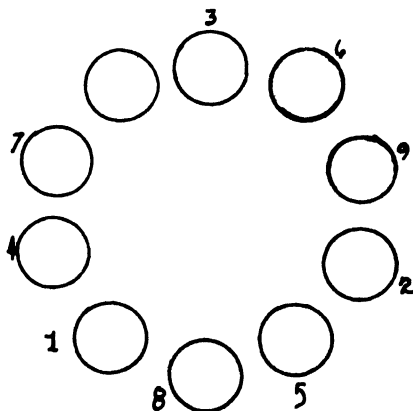


Fig. 11

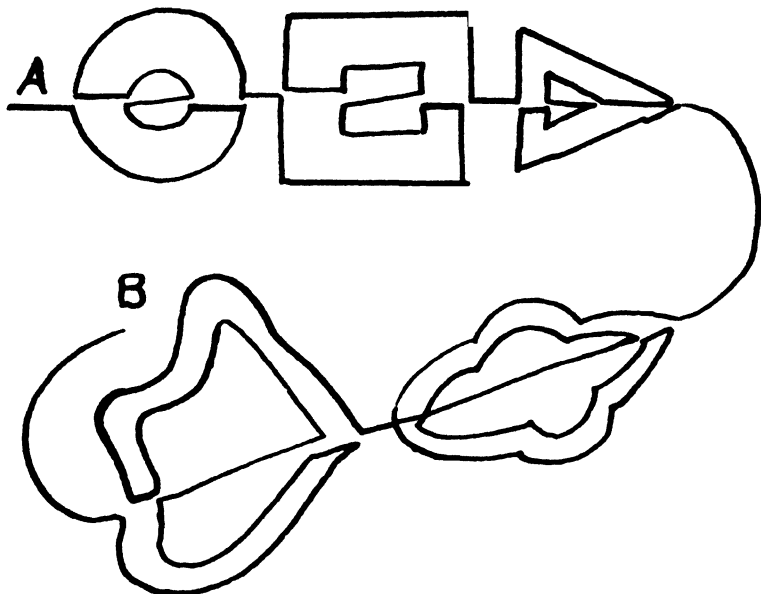
No. 26. Geometrical Puzzle. (Fig. 11.)



No. 27. Crossette. (Fig. 12.)

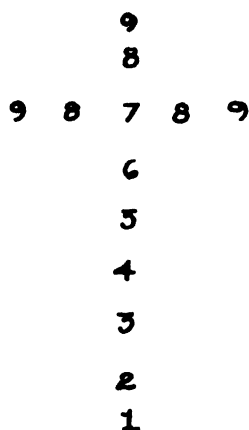
Fig. 12

No. 28. The Crown Problem. Place the 4th on the 1st, the 6th on the 9th, the 8th on the 3rd, the 2nd on the 5th, and the 7th on the 10th.

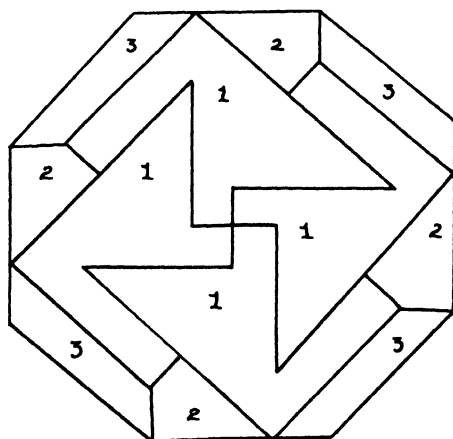


No. 29. A Trick for Clever Pencils. (Fig. 13.)

No. 30. The Puzzling Puzzle. The jeweller arranged the pearls thus:



(Fig. 14.)



No. 31. The Magic Octagon. (Fig. 15.)

No. 32. A Presidential Puzzle. (a) Buc (h) anan. (b) Gr (a) nt. (c) Ga (r) field. (d) A (r) thur. (e) L (i) ncoln. (f) Haye (s) (g) Johns (o) n. (h) Clevela (n) d. Harrison.

No. 33. The Puzzle Board.

Oft in the stilly night
Ere slumber's chain has bound me,
Fond memory brings the light
Of other days around me.

No. 34. A Word Puzzle. Cleveland.

No. 35. The Legacy. The cadi lent a camel to the brothers, making 20 camels, which he bade them divide. The eldest son took one-half, or 10 camels; the second, one-fourth, 5, and the third, one-fifth, 4, making 19 camels among the three brothers, and one to be returned to the cadi.

No. 36. A Charade. Chickweed.

No. 37. The Philosopher's Puzzle. The philosopher blocked up each corner of his window in such a way as to leave a diamond shaped opening of the same width and length as the original window.

No. 38. The Bishop of Oxford's Puzzle. Eye. Drums. Feet. Nails. Soles. Muscles. Palms. Tulips. Calves. Hares. Heart. Lashes. Arms. Veins (vanes). Instep. Chest. Ayes and Noes. Pupils. Tendons. Temples. Crown. Gums. Eyes. Palette. Skull. Bridge. Shoulders. Elbows. Cords.

SOLUTION OF FIRST ENIGMA

M	A	N	Y	H	A	N	D	S	M	A	K	E	L	I	G	H	T	W	O	R	K
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

M	A	Y			
H	O	M	E		
N	O	W			
G	I	R	L		
R	A	K	E		
D	A	N			
D	E	W			
R	O	A	D		
H	A	T			
K	E	R	N	E	L

Many hands make light work.

No. 39. First Enigma. (Fig. 17.)

No. 40. Second Enigma. When the cat's away, the mice will play.

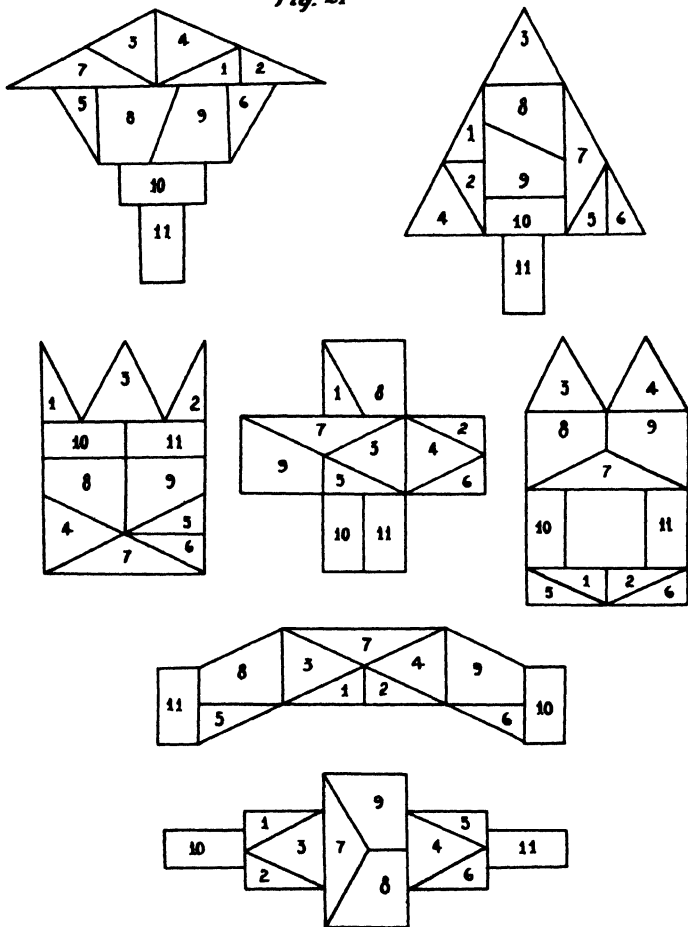
No. 41. Third Enigma. A Rolling Stone Gathers No Moss.

No. 42. Fourth Enigma. Washington Irving.

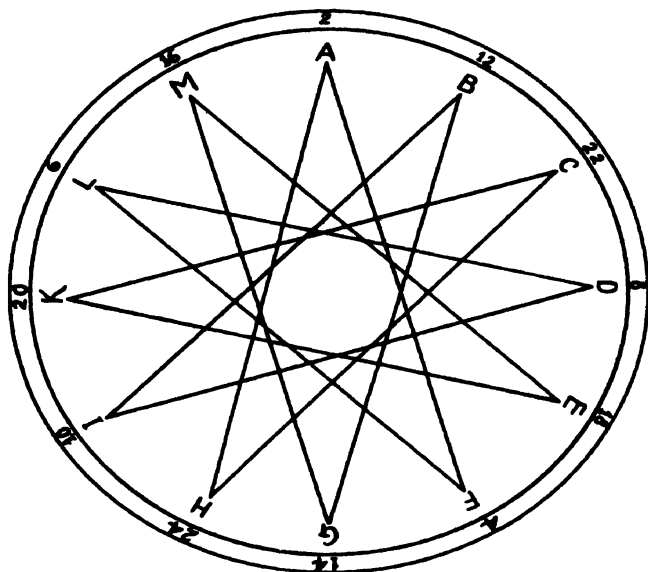
No. 43. The Five Arab Maxims. Read the first and second alternatively.
 "Never tell all you may know, for he who tells everything he knows, often tells more than he knows." Then read the first and third, first and fourth, first and fifth

PROTEAN PUZZLE

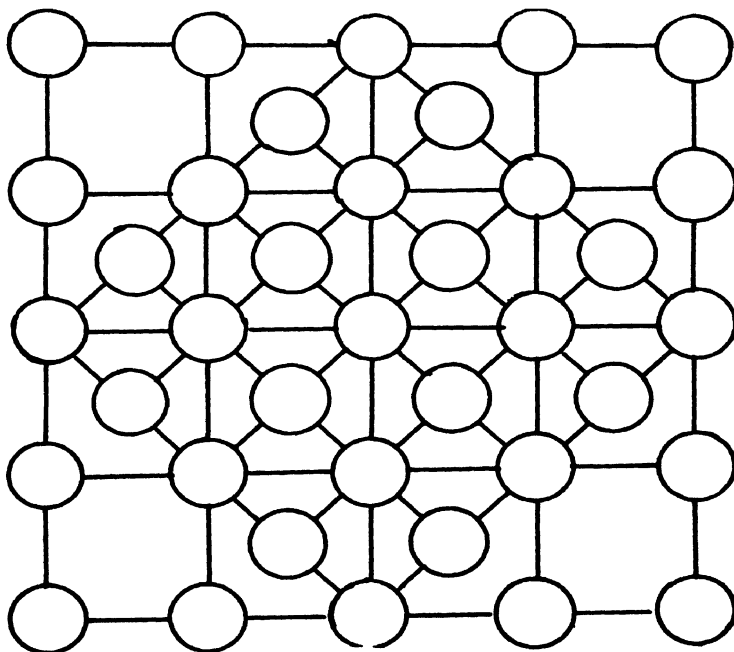
Fig. 21



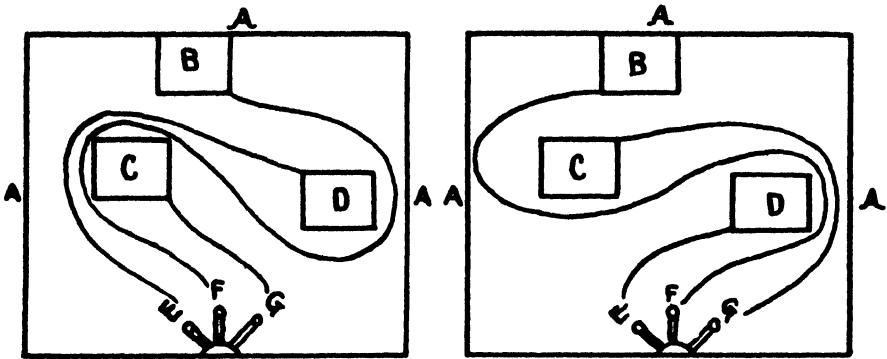
No. 44. Protean Puzzle (Fig. 21).



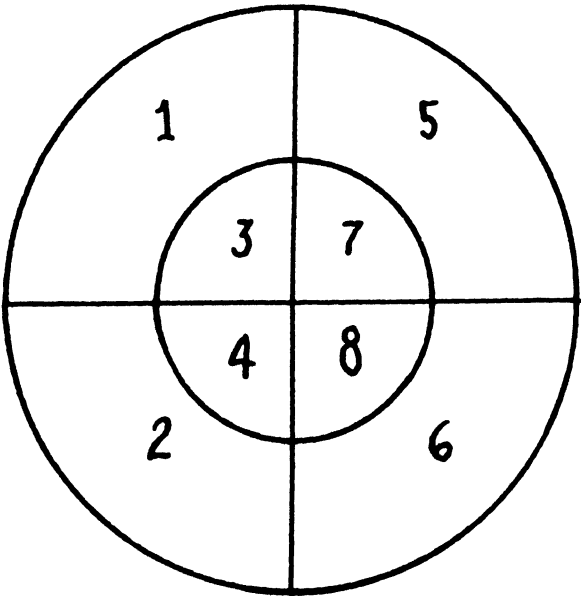
No. 45. The Twelve Cornered Star. (Fig. 22.)



No. 46. The Circle Puzzle (Fig. 23).



No. 47. The Fountain Puzzle. (Fig. 24.)



No. 48. The Cabinet Maker's Puzzle. (Fig. 25.)

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